MAY 27, 1996 VOLUME 13, NUMBER 22

# NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING


## AT&T's frame relay play

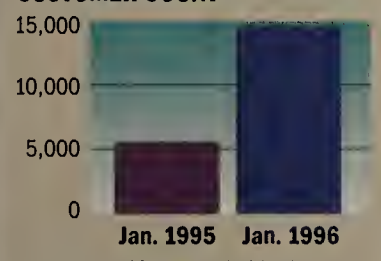
*Popular service offering blended into Tariff 12 mix.*

**By David Rohde**
*Washington, D.C.*
AT&T has given network managers with rapidly growing frame relay nets a new way to save big on transport costs, though they may have to dodge a few tricky contract clauses to get it done.

The carrier earlier this month quietly added frame relay to its venerable Tariff 12 service,

*See* AT&T, *page 68*

**WORLDWIDE FRAME RELAY CUSTOMER COUNT**




1996 survey of 22 carriers by Distributed Networking Associates, Greensboro, N.C.

**For more survey findings, see story, page 68.**

## Throwing his weight around

*CIO Michael Mullicane pumps up America II's network IS team.*

**By Charles Bruno**

Michael Mullicane, chief information officer for electronics supplier America II Group, Inc., chuckles now when he recalls his first act upon joining the firm.

Soon after the St. Petersburg, Fla., company wooed Mullicane from his former job in California, and before the CIO ever set foot in the door of his new employer, he fielded an emergency call about a hacker intrusion.

"I instructed our technicians to cut every modem cable they could find," he says. "And they did."

*See* America II, *page 49*

VICTOR GIORDANO



**Access Network World Fusion using the number in yellow. See page 5 for details.**

# Notes to go nonstop

*Clustering, parallel processing support being added to Lotus groupware package.*

**By Barb Cole**
*Cambridge, Mass.*
Lotus Development Corp. is readying a bulletproof version of Notes for the masses that boasts features now offered only to public carriers.

Due later this year, the Notes upgrade is expected to include support for clustering, which will boost reliability, and parallel replication to increase performance. Such enhancements are in demand from customers that rely on Notes for more than simple messaging.

"Today, if a mail server goes down, you're dead," according to Mark Petry, a Notes consultant in the San Francisco Bay area. "These kinds of high-availability features mean you can safely migrate from workgroup systems to a more enterprise model because you can have a group of servers that are in sync within a minute or two. Users aren't locked into a particular server."

Lotus confirmed that it will

*See* Notes, *page 15*

**A cluster of ex-Lotus employees aim to reshape Web. Page 12.**

## Compaq talks clustering

**By Ben Heskett**
Houston-based Compaq Computer Corp. next week will come out with all of its guns blazing, aiming to satisfy customer demand for more powerful servers, sophisticated server clustering and systems management.

The company's broad set of June 3 announcements,

*See* Compaq, *page 15*

**Read more on Network World Fusion, including articles on:**

- **Vendor clustering strategies**
- **How Pentium price cuts are clearing the way for p6 servers**
- **Why clustering might make moving to NT worthwhile**

**Select News+ then Front Page.**

NetworkWorld Fusion http://www.nwfusion.com

## NBase fires starting gun in race for gigabit Ethernet

**By Jodi Cohen**
*Chatsworth, Calif.*
There's been a lot of talk about gigabit Ethernet of late, but now get ready for some action.

**NBase's** *Kurtz also promises ATM support.*

NBase Communications this week will become the first company to announce an actual gigabit Ethernet product, as well as pricing. It will start shipping in the fourth quarter a full-duplex gigabit Ethernet module for its MegaSwitch II departmental LAN switch enabling customers to build a 1G bit/sec Ethernet backbone.

The market is sure to get crowded quickly, however, since a slew of start-ups and established vendors such as 3Com Corp., Sun Microsystems, Inc. and Compaq Corp. are plotting gigabit Ethernet strategies.

The technology, which costs about twice as much as Fast Ethernet and about the same as Asynchronous Transfer Mode, is expected to be used for point-to-point links between switches and for high-speed server links.

"I could really use a gigabit Ethernet connection to link two

*See* NBase, *page 68*

**THE SKINNY ON GIGABIT ETHERNET**

- Competing standards are being developed by the IEEE 802.3 and 802.12 committees.
- More than eight gigabit Ethernet start-ups have received venture capital funding.
- Will be used for linking Ethernet and Fast Ethernet switches.
- May preclude the need for ATM in the LAN backbone.
- Will support distances up to 2 km.

## Java vs. ActiveX: still too soon to pick winner in 'Net battle

**By John Cox**
It may not be entirely safe to develop large-scale, leading-edge Internet applications these days.

Internet application creation today is in turmoil as developers experiment with Sun Microsystems, Inc.'s Java language and Microsoft Corp.'s ActiveX technologies. Analysts are cautioning corporate developers to deploy either technology on a trial basis because both are so immature and are changing at a dizzying pace.

The first choice, Java, may not be the best, but it appeals to

*See* Java, *page 67*

**Which tool makes sense for you? Page 46.**

3Com AND DELL:
A POWERFUL NETWORK.

# CHANGE TO THESE SERVERS


intel inside
pentium PROCESSOR

MICROSOFT WINDOWS NT READY-TO-RUN

Parallel Tasking EZZ FROM 3COM

[1]For a complete copy of our Limited Warranties, please write Dell USA L.P., 2214 W. Braker Lane, Suite D, Austin, TX 78758. [11]This on-site parts and labor service is provided by Digital Equipment Corporation, and is available with Dell PowerEdge SP and XE systems only and is available in 29 metropolita

3Com®

What do you get when you combine the leader in Ethernet switching and the leader in Pentium computing? A new world of exciting network solutions, as 3Com and Dell embark upon our much-heralded joint venture.

Look for more innovative product offerings in the months to come.

**2 DELL® POWEREDGE™ SP 5166-2**
166MHz PENTIUM® PROCESSOR

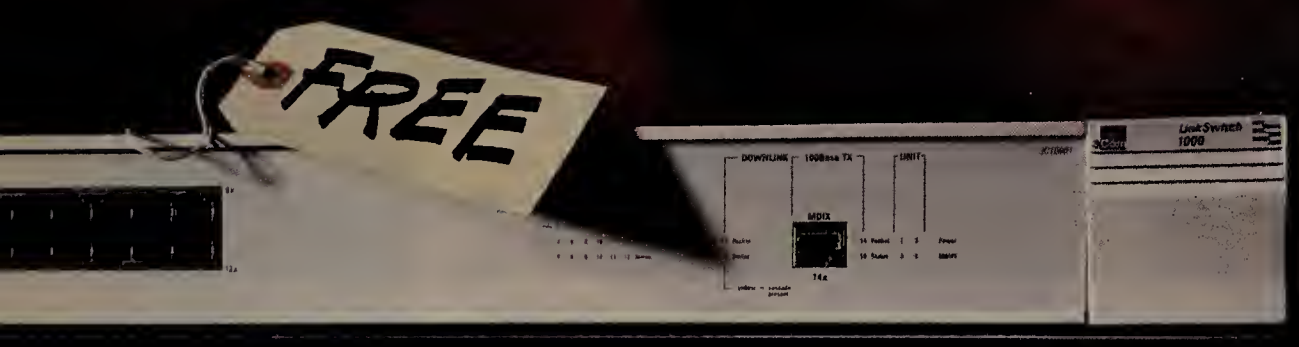
- 32MB Parity RAM/4GB SCSI HDD
- 256KB Cache (Upgradeable to 512KB)
- 3Com® EtherLink® III 10/100 PCI Adapter Card
- 6X CD-ROM
- 15LS Monitor (13.7" v.i.s., .28NI)
- Safesite™ Server Management Software
- 3 Year† BusinessCare℠ Service††

**3Com LINKSWITCH 1000**

- 12 Switched 10BASE-T Ports
- 1 100BASE-T Uplink Port
- 1 3Com LinkSwitch 100BASE-TX TP Downlink Module

Standard Price
**$12,798**
Offer Ends 6/28/96.

# AND WE'LL MAKE THE SWITCH FREE.




There are two things everyone wants more of these days. Money and network bandwidth. Well, in cooperation with our friends at 3Com, we can help you out on both fronts.

Our Bandwidth Booster Bundle offers you some powerful network-enhancing tools. First, a pair of Dell PowerEdge SP 5166-2 servers, each boasting 166MHz speed and 32MB of parity RAM. Second, a 3Com LinkSwitch 1000, including two 100BASE-T Ethernet ports and twelve 10BASE-T ports. Now, with an additional server to help shoulder the workload, and a 3Com network switch to eliminate those bottlenecks, you'll find that your network-bandwidth worries are a thing of the past.

And some of your budget worries, too. You see, in celebration of our new alliance with the world's leading global data networking provider, we're including the 3Com LinkSwitch 1000 – regularly $4,825 – at no cost when you purchase the servers. At a time when "value" is fast becoming an antiquated notion, this offer is – you have to admit – quite a switch.

DELL®

**(800) 822-2869**

http://www.dell.com/

Keycode #29016

areas. For additional information, call Dell's TechFax℠ line at 1-800-950-1329 or write Dell USA L.P., 2214 W Braker Lane, Suite D, Austin, TX 78758-4053. Prices and specifications valid in the U.S. only and subject to change without

NetworkWorld

An IDG Publication


# Contents

**Sybase's** *Hoffman tries to put company's shaky recent history behind it. Page 35.*

## News



## WANs & Internetworking



## Carrier Services



**Telecom South America's** *Faller gives users more options.*

## LAN World



## Client/Server Applications



## Intranets & the 'Net



## Technology Update



## Management Strategies



## Opinions



## Features

**Weigh your options: Java applets vs. ActiveX controls.** *Page 46.*

*Server series moves up to the enterprise. Page 51.*

NetworkWorld PC WORLD SERVER TEST SERIES



**NetworkWorld's** *Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.*

## News briefs, May 27, 1996

### Keeping IBM and Microsoft nets secure

Microsoft Corp. and Proginet Corp. plan to announce June 3 a product that will provide tight security integration between Windows NT servers and IBM MVS and Application System/400 systems. SecurePass, which is due late this year, will provide two-way password synchronization between NT and host systems running either IBM's Resource Access Control Facility (RACF) or Computer Associates, Inc.'s CA-Top Secret or CA-ACF2 security software. That will make password administration easier for net managers while reducing the net's security exposure. The product slashes the number of passwords users need to remember, according to Meyer Sheik, vice president of marketing for Proginet. SecurePass runs both at the host and on NT servers, using Microsoft's SNA Server as the mechanism to link the two and synchronize passwords.

### Key components

Lotus Development Corp. intends to talk up plans for its mini-applications, dubbed Lotus Components, at PC Expo in New York next month. The company confirmed last week that it will announce support for non-Notes containers for the Lotus Components and that it plans to sell the applets via the Internet. Lotus will also unveil a components certification program to encourage third-party developers to publish and distribute components.

### Security: Mission Impossible?

According to a General Accounting Office report released last week, the Department of Defense estimates that its 2.1 million computer systems may have endured about 250,000 hacker attacks last year, primarily from the Internet. The Defense Information Systems Agency believes hackers may be successful in breaking into systems about 65% of the time. Defense officials blamed the problem on poorly designed systems and the military's use of off-the-shelf products with little or no inherent security.

### MCI to back up PCs

MCI Communications Corp. is expected to announce at Comdex/Spring '96 next week a backup service for stand-alone PCs using the Internet as a transport medium. The service, designed for mobile workers and telecommuters, will offer 30M to 40M bytes of backup storage a month.

### Making CTI more affordable

Lucent Technologies, Inc. is slashing the price of its PassageWay family of desktop computer-telephone integration products by as much as 75%. Typical costs will go from $139 to $24 per seat, said Stephen Clemente, general manager of PassageWay Telephony Services. PassageWay allows client PCs on a Novell, Inc. NetWare LAN to control commands to a telephone behind Lucent's Definity voice switch. Support for Microsoft Corp.'s Windows NT server is due later this year.

### Just the fax please

Dedicated fax network operator FaxSav, Inc. last week said it will install 30 points of presence this year to allow fax users that do not have Internet access to reap 'Net savings. The FaxSav net will accept faxes from user fax machines, convert them to Internet traffic and ship them over the 'Net as far as possible. It will then convert the data back to fax and deliver it over the FaxSav network. The move follows the Edison, N.J., company's April service launch for existing 'Net users.

### Tivoli comes down to earth

IBM subsidiary Tivoli Systems, Inc. last week said it was selected to provide system management products to the National Aeronautics and Space Administration's $1 billion Earth Observing System Data and Information System (EOSDIS) project. EOSDIS will help determine how human activities are affecting environmental conditions around the world. Hughes Information Technology Systems, NASA's prime contractor, will use Tivoli's TME 10 products to integrate and manage a distributed client/server network.

# Ameritech gets connected with MFS

**By Tim Greene**
*Chicago*

Ameritech Corp. announced a first last week — a regionwide interconnection agreement with a local competitor, MFS Communications Company, Inc. — and used the opportunity to kick a little dirt at its biggest potential competitor, AT&T.


The three-year deal lets MFS compete in all five states in the Ameritech region and offer users potentially attractive bundled local and long-distance service.

MFS historically has offered local-loop bypass and bundles of local and long distance where allowed, and it had interim interconnection agreements in Chicago and Detroit.

The new agreement will let MFS extend local service to corporate satellite offices in remote areas where the MFS network does not reach and where it previously did not have an agreement to resell local service.

By complying with the 14-point interconnection checklist spelled out by the Telecommunications Act of 1996, it also represents for Ameritech a step toward demonstrable local competition.

That proof is necessary if Ameritech is to win federal approval to sell long-distance service within its region, something the regional Bell operating company wants to do by next April.

#### Gamesmanship

In announcing the deal, Ameritech took the opportunity to blast AT&T as being the slowest potential local competitor to make progress toward an agreement. That perceived reluctance fits in the framework of the complex jockeying RBOCs and their potential competitors engage in as a deregulated local/long-distance market develops, according to Daniel Briere, president of TeleChoice, Inc., a consultancy in Verona, N.J.

AT&T wants to keep Ameritech out of the long-distance market, and Ameritech wants to keep AT&T out of the local loop as long as possible, Briere said.

At the same time, Ameritech wants to appear cooperative. AT&T, while it wants to drive a hard bargain for the lowest wholesale rates possible, also wants to sell local access as soon as possible.

"The whole trick is how to get your way without the other side getting their way," Briere said.

If the wholesale discount MFS gets on local service is large enough, it might be able to resell Ameritech local service to AT&T and still allow a thin margin for AT&T to undersell Ameritech retail local service. MFS did not comment on AT&T's approach to cooperation.

MFS and Ameritech would not reveal the discount price. But Andrew Lipman, a Washington, D.C. attorney representing MFS, said the agreement overall was the best it had negotiated anywhere and could be a model for pacts with other RBOCs.

It lets users keep their old phone numbers when they switch local carriers, and lets MFS and Ameritech bill each other at one rate — 9 cents per minute — for completing calls from the other's network. ■

# DMTF promises help for help desks

**By Ben Heskett**

Nagging interoperability problems in help desk and support services will be tackled at long last by a new working committee of the Desktop Management Task Force.

The newly formed Support Management Working Committee will create two standards. One is for exchanging electronic support service tickets between troubleshooting firms; the other defines a base level of service data for support personnel to work from.

Committee participants include Intel Corp., Hewlett-Packard Co. and Remedy Corp.

Due to the increasing complexity of client/server networks, several vendors often need to be brought in to solve a single problem. But today, most support centers cannot exchange information electronically because help desk software packages do not have interoperability protocols built in.

"These two standards are what we need just to clean up the mess," said Patrick Bultema, chairman of the committee and president of Bultema Co., a Monument, Colo.-based consultancy.

Jeffrey Tarter, executive director of the Association of Support Professionals in Watertown, Mass., said the openness of the Internet is forcing changes in the help desk market. "All of a sudden, all of these automation systems that store knowledge and electronic ticket information suddenly look like closed, proprietary systems [compared to the Internet]," he said.

**ANSWERING A CALL FOR HELP DESK STANDARDS**

**Charter members of the Support Management Working Committee include:**

- Bultema
- Digital
- Folio
- Foresight Software
- HP
- Hyperion
- IBM
- Intel
- Peregrine
- Professional Help Desk
- Remedy
- Software Artistry
- Scopus Technology
- Vantive

Documents on both standards will be released to the industry for review by the end of August. Bultema said the final specifications should be ready by January 1997.

A second help desk standards group known as the Customer Support Consortium is also working on specs, but Tarter expects the specs to be similar. ■

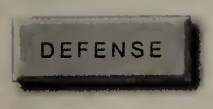
## HOW TO REACH US

**CALL:** (508) 875-6400; **FAX:** (508) 820-3467; **INTERNET:** nwnews@nww.com; **WRITE:** Network World, 161 Worcester Rd., Framingham, MA 01701; **NETWORK HELP DESK:** Having trouble resolving a technical problem, locating resources or getting a vendor to follow up on a promise? Contact the Network Help Desk at (800) 622-1108, Ext. 451, or cnerney@nww.com; **SUBSCRIPTIONS:** nwcirc@nww.com; **REPRINTS:** In quantities of 500-10,000. Call (612) 582-3800. **MARKET LINE:** For details about future editorial projects, call (508) 820-7557.

"Now that my company is on the Internet, will a fancy port scanner algorithm make

# mincemeat

of my firewall?"




The Internet lets your company open its doors to millions of potential customers, partners and contributors and, unfortunately, some potentially dangerous hackers, crackers and online troublemakers.

That's why we at IBM have some dedicated hackers of our own. We call them "ethical hackers." Working with the IBM Global Security Analysis Lab, these scientists explore the cutting edge of hacking techniques to develop better and better security countermeasures. And, as part of IBM's Security Healthcheck, they'll even try to break into your network (with your permission, of course) to look for weak spots and strengthen defenses.

Where the healthcheck leaves off, IBM's Emergency Response Service takes over. On call 24 hours a day, seven days a week around the globe, the response team makes itself intimately familiar with your network and systems ahead of time so that, in an emergency, they can respond quickly to close the breach and fix the problem.

To learn more about IBM's IT Security Consulting, Security Healthcheck, ethical hackers, the Emergency Response Service and all the products and services in the IBM SecureWay™ family, visit us at www.ibm.com/security or call 1 800 IBM-7080, ext. G121.

Solutions for a small planet™ IBM®

# Cabletron buys remote access vendor

**By Jodi Cohen**
*Rochester, N.H.*
Cabletron Systems, Inc. last week moved to fill a major gap in its product portfolio by acquiring remote access vendor Network Express, Inc. for about $114 million in stock.

The addition of ISDN routers and servers to Cabletron's product line will give its customers more options for tying remote users into existing shared and switched enterprise networks.

Initially, Cabletron will sell Network Express products as stand-alone gear but later will integrate the technology into its chassis-based switching hubs. Cabletron is expected to build Spectrum net management applications for Network Express products, as well.

"I'm looking for them to build a Spectrum module for the new products, which will allow me to manage the new gear as part of my entire environment rather than just as a generic SNMP device," said John Scoggin, chief technology advisor of telecommunications infrastructure services at Delmarva Power & Light Co. in Newark, Del.

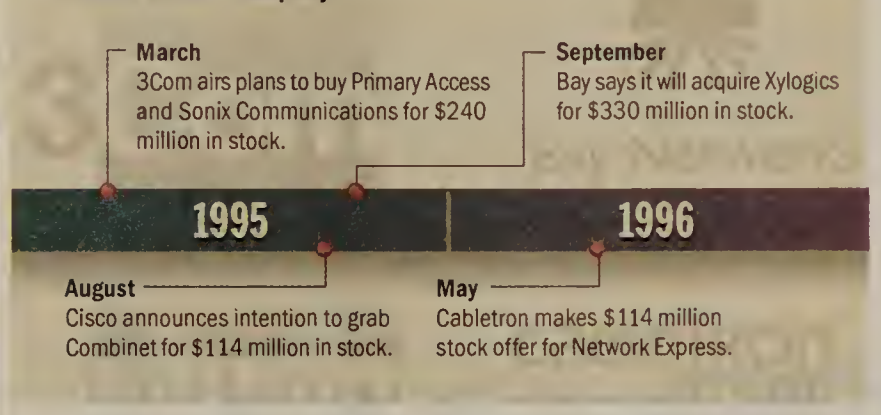
The deal marks only the second acquisition by Cabletron, an aggressive company that has been far less aggressive than its rivals in this area. In fact, Cabletron's chief competitors all have already bought remote access vendors (see graphic).

But the remote access market was too good for Cabletron to pass up. Worldwide revenue generated by sales of remote access

*See* **Cabletron,** *page 69*

**Ramping up on remote access**

**Cabletron is the last of the big four internetworking vendors to acquire a remote access company.**




# ATML offers ATM gear with IP switching twist

*Vendor also rolls out new adapter cards for migrating from Ethernet to ATM.*

**By Jodi Cohen**
*Sunnyvale, Claif.*
Start-up Advanced Telecommunications Modules, Ltd. (ATML) last week unveiled a set of switches and adapter cards designed to help ease the migration from legacy LANs to those based on Asynchronous Transfer Mode.

ATML's StreamSwitch family includes four stackable ATM switches. Each provides a software option enabling customers to switch among native IP applications now and native ATM applications later without requiring a hardware change.

Start-up Ipsilon Networks, Inc. recently introduced the concept of an IP switch that combines the intelligence of IP routing with the speed of ATM switching. ATML's StreamSwitches are not really IP-only switches like those from Ipsilon, but rather ATM switches that can be used in an existing IP environment as well as in a pure ATM net.

"I am salivating waiting to get my arms around the new IP switching code," said ATML customer Mike Trest, chief scientist at ATMnet, Inc. in San Diego. "IP switching allows ATM traffic to move around the ATM cloud without having to involve a router, which will give us a huge performance boost."

Bypassing a router improves net performance because the ATM switches can switch in submilliseconds, whereas routers take multiple milliseconds to figure out what to do with traffic, Trest said.

**The product line**

The StreamSwitch 7000 is a three-slot modular switch that can support as many as six 155M bit/sec ATM connections. The switch, which is designed for workgroup environments or server clusters, can also support Ethernet, Fast Ethernet and 25M bit/sec links.

For power workgroups, ATML rolled out the StreamSwitch 7200 and 7400 six-port 155M bit/sec switches. The 7200 is designed for buildings with a Category 5 unshielded twisted-pair copper backbone. The 7400 provides multimode fiber connections for longer distances.

ATML also rolled out a similar device — the 7600 — that offers six ports of 155M bit/sec single-mode fiber for metropolitan-area network backbones, telephone companies and Internet service providers.

In addition, the company unveiled two StreamLink adapters that support both Ethernet and ATM. The StreamLink 2010 adapter supports either 10M bit/sec Ethernet or 25M bit/sec ATM, while the StreamLink 2020 card handles Ethernet or 155M bit/sec ATM. Both adapters allow users to migrate to ATM at their own pace.

✆ATML: (408) 523-1400.

**ATML's product arsenal**

| Product | Availability | Pricing |
|---|---|---|
| StreamSwitch 7000 modular ATM workgroup switch | July | $4,000 |
| StreamSwitch 7200 6-port 155M bit/sec ATM switch for copper links | July | $12,000 |
| StreamSwitch 7400 6-port 155M bit/sec ATM switch for multimode fiber links | July | $10,000 |
| StreamSwitch 7600 6-port 155M bit/sec ATM switch for single-mode fiber links | July | $29,000 |
| StreamLink 2010 Ethernet/ATM25 adapter card | Year-end | $200 |
| StreamLink 2020 Ethernet/155M bit/sec ATM adapter card | Year-end | $500 |

**Hacker watch**

# Network security experts say insiders pose the real threat

**By Chris Nerney**
There simply is no such thing as an impenetrable network.

This was the unanimous conclusion of security experts and readers who participated in Network World Fusion's recent online conference, "Hackers on your net?"

The security experts and Network World Fusion readers also agreed that the biggest threat to the integrity of computer networks comes not from nefarious hackers probing for weaknesses in a system, but from employees who already know what they are looking for and where to find it.

**"In many ways, history may show that we should thank the hackers, our kids, for alerting us to our own vulnerabilities."**

*Security consultant Winn Schwartau*

"Insiders already have authorized access and typically attack by exceeding their authority, while outsiders normally have to first gain unauthorized access and then exceed the authority," explained Fred Cohen, president of Management Analytics, an information security consulting group.

Another panelist, Chris Goggans, founder of Computer Security Technologies and editor of the online hacker ezine *Phrack*, put it this way: "What is the likelihood that a 15-year-old will know anything important about your business or industry? Will this person know what files are important or worth money?

**See what else our panel of network consultants and readers have to say about system security -and don't forget to post your own comments -on Network World Fusion. Select Forum then click on Hacker Icon.**


Will they have the business contacts to solicit sales of this information?

"Now ask those same questions considering any of your own employees," Goggans said.

Cohen and Goggans nonetheless agreed that a skilled hacker can pose problems for computer networks. Other panelists, however, credited hackers with forcing network managers to confront the weaknesses in their security systems.

Robert Steele, president of Open Source Solutions, Inc. and a regular speaker on the hacker conference circuit, said, "Hackers are not the threat — they are the warning notice."

Panelists and readers blamed both law enforcement and corporations for lacking the proper perspective regarding hackers.

"Paranoids have no common sense, too many cops don't have a clue and pimply faced Jolt drinkers aren't understood," said security consultant Winn Schwartau.

"Law enforcement takes some of these people too seriously and others not seriously enough," Cohen said. "The same is true of corporations."

Goggans said the larger issue of computer security "is taken too lightly by all parties.

"Law enforcement officials are still coming up to speed in dealing with computer-related crimes and, therefore, don't have the experience they need to successfully investigate and prosecute these types of crimes."

A reader who identified himself as a law enforcement officer who works on computer and telephone crimes also cited a lack of resources as part of the problem.

"My partner and I are our entire unit," he said. "We've plenty to do, considering we are the only two officers in the entire southwestern Ohio area."

Advice from panelists and readers on how network managers can better secure their networks ran from the general (Cohen advised: "Get the proper knowledge.") to the specific (Schwartau said: "Get rid of passwords. Period.").

Goggans advised any company linked to public networks to "immediately take preventative measures in the form of external security devices such as Internet firewalls, link encryptors and authenticated modem pools."

He added, "They should conduct an in-house penetration test and security audit, and take corrective measures based on any findings." ■

"Can we do
business on
the Internet
without
getting

# bamboozled

by some
wily
hacker?"


Talk to ten Internet experts and you'll get ten different opinions about the future of business on the Net. But the bottom line is this: Internet commerce will grow only as fast as confidence in the security of the Net grows.

Fortunately, our confidence has grown pretty fast over the last couple of years. IBM SecureWay™ includes a variety of services and products that, over time, will make exchanges across the Internet even more secure than nonelectronic transactions.

For example, the Secure Electronic Transactions protocol, developed using iKP multiparty payment protocol from IBM Research, allows buyers, sellers and credit card companies to be joined in a single Internet transaction that is secure, confidential and verifiable.

Our Cryptolopes™ technology promises to revolutionize online publishing by providing a mechanism for controlling distribution of copyrighted materials.

And, of course, IBM is at the forefront of network security with powerful firewall, encryption and access control technology, not to mention one of the largest private secure business networks in the world – the IBM Global Network.

To learn more about IBM SecureWay and our secure transactions technology, visit us at www.ibm.com/security or call 1 800 IBM-7080, ext. G122.

Solutions for a small planet™ IBM®

# Sun to pump up Java crowd

*Vendors' plans for using Java in their products will top show news.*

**By Ellen Messmer**
*San Francisco*

The joint will be jumpin' when Sun Microsystems, Inc.'s JavaOne convention opens this week here at the Moscone Center.

As expected, Sun's JavaSoft unit will announce Kona, an operating system specifically designed to run only Java applets and applications on Network Computers, devices that will be built according to the baseline specification endorsed by much of the computer industry last week (*NW*, May 20, page 1).

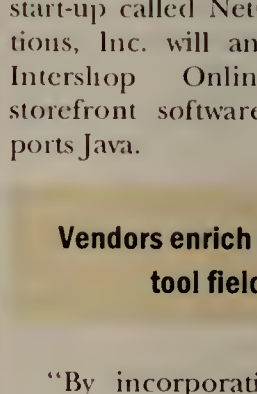
Sun's JavaSoft unit will also unveil Version 1.1 of Java, which adds encryption-based security, as well as a new Abstract Windowing Toolkit and more class libraries for HotJava. In addition, Sun will release the Java Database Connectivity specification for linking Java applications to databases. IBM, among others, is expected to support the JavaSoft enhancements in upcoming products.

Sun's SunSoft unit will announce it is adding Java-powered management administration applets to the Solstice network management product line for tracking performance management and user profiles.

NetManage, Inc. will announce plans to Java-enable its TCP/IP standards-based E-mail and newsreader client products, as well as its Web browser.

With Java E-mail, users could receive messages that contained forms to be filled out, said Fritz Mueller, NetManage product-line manager.

Once filled out, these forms, which are actually Java applets, could process themselves right on the desk and mail themselves back to the sender.



EarthWeb's *Jack Hidary (top), Murray Hidary (middle) and Nova Spivack (bottom)*

Others think just selling Java applets is a big business. New York-based EarthWeb, Inc., which operates the Gamelan Web site where developers share information about Java, will be turning the site into an online bazaar for buying and distributing Java applets from multiple vendors.

EarthWeb's own chat applet, for use in live online chat rooms, has been licensed by thousands of Web sites, said Executive Vice President Nova Spivack.

EarthWeb will be going up against Japanese giant SoftBank, Inc., which next week will unveil a similar service to sell software over the Internet.

This week, a Burlingame, Calif.-based start-up called NetConsult Communications, Inc. will announce it is selling Intershop Online, an electronic storefront software package that supports Java.

**Vendors enrich Java development tool field. Page 35.**

"By incorporating Java capabilities into Intershop now, we've laid the foundation to take advantage of many commerce-related Java applets and programs written in the future," said NetConsult Chief Executive Officer Stephan Schambach.

Software developer BulletProof Corp. will unveil jDesignerPro, a Java-powered application for developing custom client/server interfaces and front ends for their Open Database Connectivity-compatible data sources.

Finally, NTT Data Communication Systems Corp. will introduce a Java-based Internet information query and filter service called InterInfo. Expected to be available in September, the service will let users scour the Web.

Later, NTT Data will sell the search engine to corporations that want to use it on their corporate intranets. ■

# THE SOUND OF ISDN SPEED

# CONGO

## VOICE ROUTER

**Easy to use, affordable ISDN networking for home or small office voice and data applications.**

ACC introduces Congo Voice Router, the powerful, sleek choice for telecommuters, small offices, or the Internet surfer. With lightening fast speed, you can now connect to the ISDN network for all your voice and data needs.

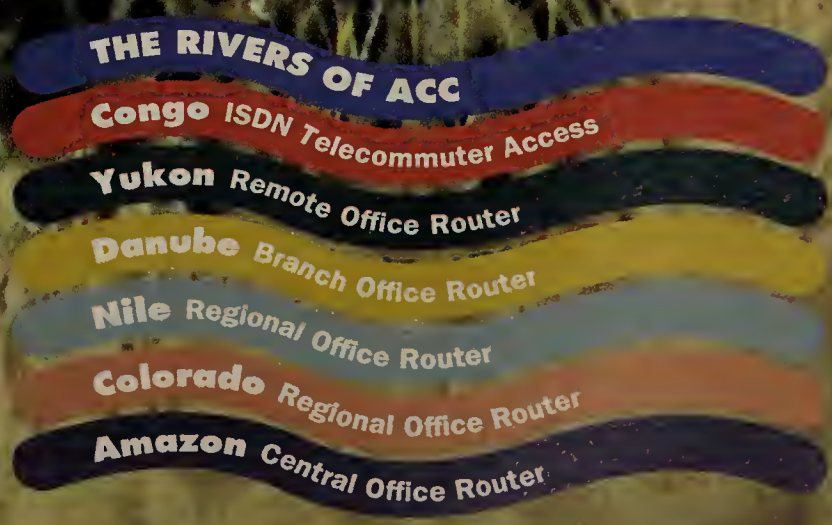
Best of all, Congo Voice Router comes with ACC's agile Web Wizard™, an HTML-based configuration/installation tool. Web Wizard is the only configuration tool on the market today using a Web browser running on a PC. With graphics and hot links to guide you through the installation process, fast ISDN access is just minutes away.

Congo Voice Router comes standard with Web Wizard, two analog POTS connections, one 10BaseT connection, and an ISDN Basic Rate interface – all wrapped up in a compact enclosure. Congo Voice Router is SNMP and Telnet manageable.

So heed the call of the wild and put the power of Congo Voice Router on your desk today.

**Call 1-800-444-7854**

and receive a FREE Travel Guide to the Rivers of ACC.




ACC

Access begins with ACC.



Visit ACC's home page at: http://www. acc.com

# Narrative tells of new multimedia Web

*Start-up run by former Lotus officials, backed by $3 million in venture funding.*

**By Doug Barney**
*Waltham, Mass.*

A batch of Lotus Development Corp. refugees do not want to wait for broadband access to get rich Web sound and animation.

Instead, start-up Narrative Communications, Inc., backed by nearly $3 million in venture capital, today will unveil Enliven, a system that squeezes the same fancy graphics, sound and animation of today's multimedia CD-ROMs onto a standard phone wire — and serves it all up to users with 14.4K bit/sec and 28.8K bit/sec modems.

Enliven promises, for example, full-screen VGA-style animation of 10 frames per second over a 28.8K bit/sec modem.

"It changes dramatically what you can do on the Web," said John Landry, chairman of Narrative and formerly chief technology officer at Lotus, who still advises IBM on Internet strategy.

Narrative's software uses data compression and multithreading to achieve its performance, said Hilmi Ozguc, the company's president and chief executive officer.

"It makes animation as realistic on a 28.8 modem as most people get off a T-1 line," said Dick Shaffer, editor of "The Computer Letter," an influential newsletter published by Technologic Partners in New York.

One content developer agreed. "Graphics and graphical materials right now are the things that make a user very frustrated because you have to wait so long to download," said Jeff Schon, president and CEO for San Francisco-based Living Books.

**Narrative's** *Landry says Enliven will change what you can do on the Web.*

Enliven has two aims. First, it could allow Webmasters to jazz up static sites. Second, it could reduce costs for those that already have sound- and animation-intensive sites by reducing the bandwidth required to host these sites.

The same logic applies to corporate end users. "Even if you have a T-1 into your office, the bandwidth on a saturated network is significantly lower," Landry said.

Narrative officials also said the technology will support new forms of Web content, such as:

- Interactive kiosks
- Animated advertising
- Trials of multimedia software
- New online sites for children
- Software rentals over the 'Net

Shaffer believes in the Narrative story. "They can make an important difference [on the Web] in very short order," he said.

The Enliven system has three main parts. The Enliven Producer takes content from other authoring tools and puts it into a new compressed format. That content is then hosted on the Windows NT-based Enliven Server, which can handle hundreds of simultaneous users.

On the client side, PCs must be equipped with Enliven View. This software, which runs on Windows 95, is multithreaded. The software can perform four tasks at once: decompression, rendering, fetching and traffic management.

To show what the technology can do, Narrative has created a demo that uses a Living Books' CD-ROM title. Using standard Web and modem technology, along with the Macromedia ShockWave compression utility, a user could compress a 2.5M-byte file containing a page from a Living Books book down to 1.4M bytes. It would then take 8 minutes to download the file, allowing the user to see the first page of the book. This process would have to be repeated for each subsequent page.

With Enliven, the same title begins to play back after only 40 seconds and then streams continuously over the 28.8K bit/sec connection, Ozguc claimed. Shon compared the performance to a double-speed CD-ROM.

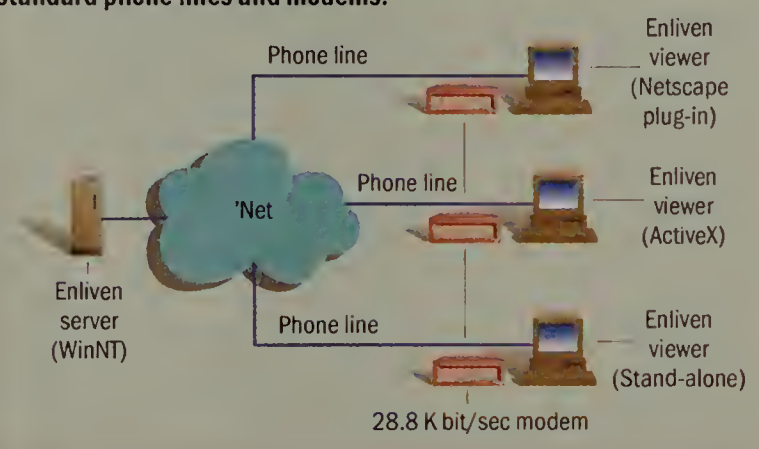
"I haven't seen anything else like this," said Mark Crumpacker, CEO of Studio Archetype, Inc., the San Francisco-based firm that created sites for 24 Hours in Cyberspace and 20th Century-Fox.

The Enliven Viewer went into beta test this week. The Enliven Producer and Enliven Server will enter testing this summer.

All Enliven products should be commercially available by year-end. Pricing was not available. ■

### Narrative spins multimedia Web tale without the broadband

**Through a combination of compression and multithreading, Narrative aims to run CD-ROM-style multimedia applications over the Web using standard phone lines and modems.**




### Q: Where are they now? A: At Narrative

**Hilmi Ozguc, president and CEO**
Former Lotus director of electronic commerce

**John Landry, chairman**
Former Lotus chief technology officer

**Scott Kilger, vice president of engineering**
Former chief architect for Lotus' Next Generation Products Group

**Allison Parker, vice president of marketing**
Former Lotus director of product management and marketing for the InterNotes product line

# 1 Gigabyte Hard Drive

*(Perfect for containing your 12-hour workdays)*

# 120 MHz Pentium Processor

*(Perfect for flying through every application)*

# Under $1,700*

*(Perfect for making accounting happy)*

The joke in the computer business generally goes something like this: performance, quality, affordability—pick any two. Well, it seems Compaq has rendered that little witticism a bit obsolete. Our Compaq ProLinea models, which start under $1,325,* offer Pentium® technology to run Windows® 95, the speed of PCI bus architecture, and a variety of unique serviceability features. Which means now, things sound a bit more like this: performance, quality, and affordability—pick *three*.

COMPAQ

Has It Changed Your Life Yet?



intel inside
pentium® PROCESSOR

http://www.ascend.com

## In the complex world of Telecommuting, there's only one comprehensive solution.

Telecommuting. It sounds simple enough. Until you actually have to build a seamless and secure program. One that can address the key building blocks of Telecommuting: remote site equipment, central site equipment, network services, Internet access, plus advanced security and management. Surprisingly, only one company can deliver a totally integrated, scaleable solution. Ascend.

With superior products and partners, Ascend provides everything you need to integrate a successful Telecommuting program. They insure interoperability across all types of network services – both digital and analog – including ISDN, Frame Relay, and other dial-up services.

You can get started today. For a free Telecommuting Planning Guide call 1-800-632-8347 ext. 307. It can be that simple. Really.

ASCEND

**Remote Networking Solutions That Work.™**

## Notes

*Continued from page 1*

exploit clustering within Notes, but declined to provide specifics of the plan.

Clustering involves linking several servers, enabling them to work together to process applications efficiently. Server clustering has become a hot topic of late, with Microsoft Corp. and server vendors such as Compaq Computer Corp., Digital Equipment Corp. and Hewlett-Packard Co. outlining plans and rolling out new offerings.

In the messaging arena, HP already offers several features within OpenMail to exploit its own high-availability servers and operating systems.

In a Notes environment, clustering entails finding an alternative Notes server whenever one is down. Today, Notes users can accomplish nominal failover through the use of proxy servers, but that approach is limited, analysts and users said. Proxy servers typically require users to manually switch servers after being notified of a problem, whereas clustering would automatically reroute users, according to Scott Durgin, director of Notes product management at Lotus.

"The goal is that there is no user intervention needed," Durgin said.

The clustering support will work across the broad range of hardware platforms and network protocols currently supported by Notes, he added.

The Notes improvements actually will extend well beyond clustering and include support for mirrored mail files, which are replicas of mail files available on backup servers, sources said.

"These high-availability features were originally developed for the public networks to provide the kind of reliability users get with the public phone system," said David Marshak, an analyst at Patricia Seybold Group, Inc. in Boston.

While groupware is not exactly synonymous with high-availability applications, that is changing as more companies eye groupware platforms as the basis for collaborative applications over the Internet, Marshak said.

"We're not talking about the casual discussion threads that are typically associated with groupware," Marshak said. Instead, these high-end features are aimed at companies that are deploying strategic collaborative applications around Notes, he added. ■

### Are server clusters for you?

**Pros**

- Offer improved availability through application failover
- Boast near real-time replication
- Have the ability to automatically route work to the least busy server

**Cons**

- Often need special versions of software to exploit them
- Often require special management capabilities
- Are not yet supported on all platforms

## Compaq

*Continued from page 1*

much of which has been expected, will target these areas:

■ Clustering, with an enhanced version of Standby and On-Line Recovery Server for Windows NT, two-node failover technology based on Tandem Computers, Inc.'s ServerNet technology and multinode clustering.

■ More powerful servers, including 166-MHz and 200-MHz Pentium Pro-based models as well as a Pentium Pro intranet server bundle, due later in June.

■ Management, highlighted by of Insight Manager 3.0. The revised server and desktop management tool makes it easier for companies to manage remote devices. Compaq will also air partnerships to provide Insight Manager with hooks into systems and network management platforms from Hewlett-Packard Co., IBM and IBM subsidiary Tivoli Systems, Inc.

In addition, Compaq will evolve its SmartStart server software installation technology, now on Version 3.0, by opening it up to third-party software developers. Compaq will release a SmartStart software developers' kit by the second half of the year, making it easier for vendors to optimize their applications to run on Compaq machines.

■ Service and support, including an Internet-based software upgrade and support service that notifies customers when upgrades are available and uses a World-Wide Web site to disseminate the upgrades to customers.

The new offerings will make customers think of Compaq in more of an enterprise network light, observers said.

"You could term Compaq as not a PC server vendor anymore, but a superserver vendor," noted Brad Day, vice president and senior analyst at the Giga Information Group consultancy in Norwell, Mass.

Central to the company's strategy is positioning Compaq servers to handle more mission-critical applications, a job often done best by clusters of servers.

The company already provides limited clustering on its Pentium servers but will go beyond that with its Pentium Pro machines. Compaq will use Tandem's ServerNet technology and Microsoft Corp.'s Windows NT APIs, code-named Wolfpack, which will appear later this year and next year.

In the second half of this year, Compaq will also debut a mirrored storage clustering capability, with two storage arrays attached to two servers copying data to both arrays.

"Clustering cannot come soon enough for us," said Randy Lewis, director of information and telecommunications services at Lyondell Petrochemical Co. in Houston, who wants the flexibility, reliability and power of clustered systems as his network continues to grow.

While clustering will make Compaq's servers more powerful by combining their processors, the company is also firing up more robust individual machines.

The company will introduce the ProLiant 5000, a top-of-the-line server family fueled by as many as four 166-MHz or 200-MHz chips.

The ProLiant 5000 features a PCI system bus, error correction memory and EISA support. According to sources, the 5000 offers twice the memory bus bandwidth of Compaq's current high-end offering, the Pentium-based ProLiant 4500, and eight times the I/O bandwidth of the 4500.

The 166-MHz ProLiant 5000 comes with 512M bytes of Level 2 cache, 128M bytes of RAM and two processors. The 200-MHz model will include 256M bytes of Level 2 cache, 64M bytes of RAM and one processor standard.

Compaq will also soon announce a quad-processor Pentium Pro intranet server with a bundled Raptor Systems, Inc. EagleNT firewall, Microsoft SQL 6.5 and Insight Manager management capabilities. The server will be based on the two base models of the ProLiant 5000.

In addition, Compaq will unveil a low-end ProSignia 300 workgroup server based on a 150-MHz Pentium processor.

Complementing the clustering and server announcements, Compaq will expand its management offerings.

Under a program dubbed Starship, scheduled for completion later this year, Compaq will enable an Insight Manager console to access data from HP's OpenView and IBM's NetView management platforms. Compaq will also announce agreements to integrate Insight Manager with systems management tools from Boole & Babbage, Inc., Tivoli, Seagate Enterprise Management Software, Inc., Cabletron Systems, Inc. and BMC Software, Inc.

"The problem with a lot of the 'Intel inside' vendors is that the management of their environment is strictly server management — it's not a distributed computing management platform," Giga's Day said.

Insight Manager 3.0 will also add a remote management hardware card so the current LAN diagnostic tools within Insight, such as alarm notification, will be expanded for remote use. ■

### KEEPING AN EYE ON THE COMPETITION

**Compaq's rivals in the PC server market all have clustering strategies in the works — all of which are tied to Windows NT's growing scalability.**

- HP: Will announce May 29 failover clustering capabilities based on its MC/ServiceGuard software layer.
- Digital: Announced earlier this month failover clustering capabilities that will work with NT's Wolfpack clustering APIs and be available by year-end.
- IBM: Will roll out next month its failover clustering capability and clustering road map at PC Expo in New York.

# Plug in to high bandwidth

*Paradyne PC cards support up to T-1 over regular telephone lines.*

**By Tim Greene**
*Largo, Fla.*

AT&T Paradyne last week announced a trial of the first PC add-in cards to support Asymmetric and Symmetric Digital Subscriber Line technologies, which offer speeds three to 12 times faster than ISDN over the same copper lines. Previously, the technology was available only in stand-alone modems. The PC add-in cards demonstrate that the technology is rapidly maturing toward general deployment, according to Frank Weiner, Paradyne director of broadband products.

In the trial configuration, the Asymmetric or Symmetric Digital Subscriber Line (ADSL or SDSL) card pushes the interface with an Ethernet network from the user premise out to the central office of the carrier offering the service.

With this approach, the card eliminates the need for the user to install a separate Ethernet card in the PC, said Kieran Taylor, a broadband consultant with TeleChoice, Inc., a consultancy in Verona, N.J.

At the central office end, a PC that holds about 20 of the modem cards interfaces over an Ethernet link with a router.

The card trials, being conducted by KPN Research in the Netherlands, include remote LAN and Internet access. "It looks and acts like a [network interface card] or a LAN interface card," Weiner said about the Paradyne device.

### ADSL, SDSL ARE IN THE CARDS

**AT&T Paradyne is trialing PC add-in cards supporting Asymmetric and Symmetric Digital Subscriber Line technology.**

- **ADSL card** – 1.5M bit/sec downstream, 64K bit/sec upstream over standard phone lines
- **SDSL card** – 384K bit/sec in both directions over standard phone lines

Even though the trial is in Europe, the product will be available in the U.S., where carriers plan to decide whether to offer ADSL/SDSL services later this year.

The Dutch trial, among about 20 employees of the phone company, also includes a teleconferencing service supported by the SDSL cards, Weiner said.

Each trial user's PC has a card. Before reaching the PC, the analog voice signal that is also carried on an ADSL or SDSL line is separated by a stand-alone voice splitter.

Weiner said later this year, Paradyne will offer a carrier-access box to support hundreds to thousands of ADSL and SDSL lines. ■

# Netscape upgrades discussion server

**By Carol Sliwa**

Netscape Communications Corp. last week launched an upgraded version of its News Server software for creating and managing threaded discussion groups over the Internet and intranets.

The new version adds access control so administrators can restrict which users have access to discussion groups, locking out the public if they choose. Like the other parts of Netscape's integrated suite of server software, News Server 2.0 can be managed from a common console using Netscape's Navigator Web browser.

It also features support for Java and JavaScript, as well as X.509 digital certificates and Secure Sockets Layer 3.0 for encryption. In addition, the server supports the Network News Transfer Protocol on TCP/IP networks so discussion groups can be replicated to Usenet-compatible news servers.

A beta version of News Server 2.0 for major Unix platforms and Windows NT is available from Netscape's Web site. Version 2.0, priced at $995, will be generally available by July.

✆Netscape: (415) 937-2555.

NetworkWorld
TECHNICAL SEMINARS

# Intranets:
## TECHNOLOGIES, TOOLS & STRATEGIES

**Key Topics you don't want to miss!**

- **ENHANCE**
  **information publishing for users, workgroups and the organization**
- **INTEGRATE**
  **existing applications and data into your Intranet**
- **ESTABLISH**
  **and maintain the security and integrity of your Intranet**
- **EVALUATE**
  **and select Intranet products**
- **much more!**
  **(see inside!)**

**1996 SEMINAR LOCATIONS & DATES**

**ATLANTA, GA**
*May 30*

**WASH., DC**
*May 31*

**NEW YORK, NY**
*June 3*

**BOSTON, MA**
*June 4*

**IRVINE, CA**
*June 11*

**SEATTLE, WA**
*June 18*

**SAN FRANCISCO, CA**
*June 19*

**MORRISTOWN, NJ**
*June 27*

**CHICAGO, IL**
*June 28*

**PHILADELPHIA, PA**
*July 23*

**DALLAS, TX**
*July 25*

**DENVER, CO**
*August 5*

**MINNEAPOLIS, MN**
*August 7*

**CINCINNATI, OH**
*August 8*

**OFFICIAL SPONSORS**

Novell.

Attachmate™
*The Intranet Company*

FEDERAL COMPUTER WEEK

CHECK POINT
Software Technologies, Inc.

*Call* **1-800-643-4668**

## Maximize Your Corporate Information Resources

**What do DHL, Northern Telecom and Ford have in common? The answer is Intranets.**

They are among the scores of companies of all sizes who have discovered the potential for an Intranet — an internal management information system based on Internet technologies. Intranets change the way we think about information access and distribution as well as transform network infrastructures.

According to International Data Corporation (IDC), Intranets are growing faster than the Internet itself. The number of Intranet Web servers now comprise 55% of total Internet servers and are expected to nearly triple in size this year to more than 200,000 and to exceed 4.5 million by the year 2000.

While Intranet Web servers today act mainly as document publishing systems, a number of vendors are now rapidly extending their functionality. For example, Web servers are being integrated with databases, linked to mainframes and other legacy systems, and are providing workflow services. Combined with the high bandwidth capacity of corporate data networks, your organization can capitalize on advanced features such as real-time audio and video as well as collaborative applications and 3-D data representation.

*Intranets: Technologies, Tools & Strategies* is a practical, information-packed one-day seminar which offers you, a network manager, business strategist or corporate technologist, the first real opportunity to gain the insight and information you need to effectively leverage Intranet technologies. You will explore the leading and emerging tools which bring corporate Intranets to life, analyze current user case studies and learn how to implement a strategy for maximum corporate impact.

## 10 benefits of investing a day at this seminar

1. Gain detailed insights about the integration of corporate databases and other information sources with Intranet services
2. Explore the range of tools available for building, managing and using Intranets
3. Ensure that you make the right decisions about security on your Intranet including where and how to implement firewalls
4. Explore information publishing on your Intranet at the corporate, group and individual levels
5. Analyze the positioning of market leaders such as Microsoft, Netscape, Novell, Sun and Attachmate and how their plans will impact your Intranet solutions
6. Explore the future of Intranet technology with Sun's Java and the rendition of data in three dimensions with VRML
7. Learn the direction of Intranet-based groupware
8. Strategically plan your Intranet and quantify your Return-on-Investment
9. Learn how to select the best Web server products for your Intranet
10. Explore the theory and operation of Web servers

SATISFACTION 100% GUARANTEED

# Seminar OUTLINE

### Intranets Redefine IT

At the heart of most Intranet systems are Web servers. These simple but effective information distribution mechanisms are becoming increasingly sophisticated as vendors extend and enhance their basic functionality. Intranets can also involve the use of TCP/IP as a transport and a number of TCP/IP applications that range from file transfer to audio and video distribution.

In this segment, you will learn components of Intranets and build a detailed MIS architecture and management model. We will also quantify the costs and constraints of building an Intranet and discuss the impact an Intranet can have on existing network infrastructures.

***We'll cover:***

- How the Internet has redefined information publishing
- How an Intranet differs from an Internet presence
- Why Intranets work
- Intranets as groupware solutions and integration strategies with Lotus Notes

### CASE STUDIES 1:

**Focus on Needs, Costs and Benefits**

In our first set of case studies, you will examine a number of end users, including DHL, who have built successful Intranets. We'll discuss the needs that drove their Intranet development and, most importantly, the Return-On-Investment equation for real Intranets.

### The Ten Pillars of the Intranet

To help you build your Intranet solution, we will cover the ten key steps of Intranet construction:

1. Planning: Quantifying the needs and wants of the organization in terms of Intranet deliverables
2. Design: Defining the architecture and implementation of Intranet systems
3. Security: Ensuring that the data and processes of your business are protected and their integrity can be assured

**ON THE WEB** For information on all of our seminars, visit us on the World-Wide Web: **http://www.nwfusion.com**

**ON-SITE SEMINAR**

4. Data: Planning and implementing access to both existing and new data sources. This includes accessing data external to the Intranet
5. Tools: Identifying the right tools for the job
6. Integration: Planning migration to an Intranet strategy
7. Promotion: Ensuring that the organization understands what the Intranet is for and sees it as a corporate and personal productivity aid
8. Training: Planning and implementing user and technical staff training for Intranet use and development
9. Support: Supporting and servicing your Intranet population
10. Management: Managing and controlling your organization's Intranet

## Intranet Technologies

This section breaks down Intranet technologies to build a model of service. We start with the TCP/IP suite and detail the technical aspects of Intranet systems at each layer. Attendees will gain a thorough understanding of the benefits and consequences of each service and how it is implemented in commercial products.

***This section will include:***

- Transport Layer: High-speed local area access and its impact on Intranet performance and manageability
- Internet and Host Layers: TCP/IP and alternatives
- Application Layer: BOOTP, WINS, FTP, Gopher, News, HTTP
- Foundational Design: Security, integration with existing LAN systems, firewalls, network management, and reporting
- Web Server Backend Services: Common Gateway Interface and variants including: Standard CGI, Microsoft's ISAPI, Netscape's NSAPI, Novell's RCGI

## Intranet Tools

In this section we will discuss and demonstrate tools to support user operations and activities including file access, Web browsers, groupware solutions (whiteboards and conferencing), electronic mail and construction tools such as Web servers, Web server extensions, HTML editors and software development toolkits to build the Intranet.

***We'll cover:***

- Information services: Gopher, IRC, News, Talk, e-mail
- Web clients: Microsoft, Netscape, Spyglass derivatives and other choices
- TCP/IP application suites: Netmanage, Spry, FTP, Frontier
- Application development: Software Development Toolkits for Intranet use including products from Microsoft, Sun and Attachmate
- HTML editors: HotMetal, Frontpage, Blackbird
- Web servers: personal, group and corporate publishing systems based on Novell's Netware Web Server, Attachmate's Host publishing systems, Process Software's Purveyor, Netscape's Communications and Commerce Servers and O'Reilly & Associates Website
- CGI Scripting: Building backend services
- Integration: Linking your Intranet to your corporate information and databases as well as leveraging Lotus Notes
- Publishing: Information services on Intranets and linking them to the outside world
- Emerging tools: Adobe PDF, Shockwave, plug-ins, CU-SeeMe

## CASE STUDIES 2:

**Strategy and Implementation**

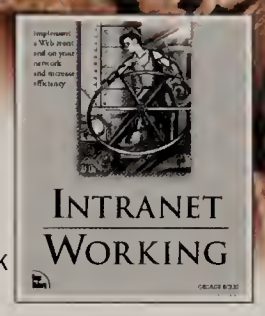
In our second set of case studies, we will look at Northern Telecom, Ford and other end users and examine how they built their Intranet solutions.

## The Future of Intranets

In this concluding session, we will examine the future of Intranets and take a detailed look at the tools of the future with demonstrations of Sun's Java and Java Script as well as Microsoft's Visual Basic and VB Script and 3-D Data Rendition using Virtual Reality Markup Language.

## REGISTER
### and You Will Receive . . .

- Comprehensive seminar workbook
- Copy of newly released *Intranet Working* by George Eckel
- Luncheon and break refreshments
- All of the above included in your $395 registration fee




**Note: If you can't attend, call us and order this informative and useful attendee materials kit for just $99.95!**

## ABOUT THE PRESENTER

For over fifteen years, Mark Gibbs has developed technical and service operations, consulted, lectured and authored articles and books about PCs and networking. His areas of expertise include Internet and Intranet technology, Web design, electronic commerce, technology analysis, strategic planning, collateral development and high-tech marketing.

Gibbs is the author of the best-selling titles *The Absolute Beginner's Guide to Networking* (Sams Publishing, Second Edition 1995), and *Navigating the Internet* (Sams Publishing, 1993 and Deluxe Edition, 1994 and 1995). Gibbs is the editorial director for *Network World*'s supplement, *IntraNet Magazine,* and has had articles published about PC and networking technologies for many periodicals including *Byte, Pen Computing, Inform Magazine* and *Office Computing Report.*

In conjunction with *Network World*, Gibbs has presented seminars to thousands of attendees nationwide including "NetWare 4.x Strategic Migration," "Capitalizing on the Internet," and "Capitalizing on the Web."

Gibbs was co-founder of the UK operation of Novell Inc., where he was responsible for the management of all technical services. He also worked for Novell's Strategic Marketing Group and Novell International. Gibbs is currently the president and principal analyst of Gibbs & Co., a consulting and analysis firm based in Ventura, California.

# Registration Form

## Attendance Is Limited–Register Today!

**Confirmation**
We will mail you a confirmation notice and complete course location information within 48 hours of receipt of your registration.

**Team Discount**
If three or more registrations are made at the same time for members of the same organization, you may deduct $50.00 off each registration fee!

**Seminar Times/Locations**
Registration for this seminar will begin at 8:00 a.m. The seminar will begin promptly at 9:00 a.m. and will end at 5:00 p.m. The seminar meeting room will be posted in the hotel lobby. The luncheon room location will be announced at the seminar.

**Hotel**
We have reserved a limited number of overnight rooms on an individual call-in basis at each hotel for seminar attendees. If you require a room, please contact the hotel listed on your seminar confirmation form as soon as possible since the rooms are held for a limited time. When calling, please indicate that you will be attending the *Network World Technical Seminar* in order to receive a preferred room rate.

**Cancellation Policy**
Cancellations must be received in writing at least 10 business days prior to the seminar date in order to receive a full refund. After this date, any cancellation will be subject to a $125 cancellation charge, which may be applied to any future *Network World Technical Seminar*. Any registrant who does not attend a seminar and has not previously canceled will still be liable for the entire seminar fee. You may make an attendee substitution at any time. In the unlikely event that a seminar date must be canceled, Network World, Inc. will be liable for a refund of the seminar fee only.

**Continuing Education Unit (CEU)**
The Continuing Education Unit (CEU) is the nationally recognized standard unit awarded for participation in qualified programs of Continuing Education. 0.65 CEUs will be awarded for each seminar day attended.

**REGISTRATION 1** (please photocopy additional forms as needed)

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____ FAX _____

INTERNET E-MAIL _____

**REGISTRATION 2**

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____ FAX _____

INTERNET E-MAIL _____

## Intranets Seminar Dates & Locations

| | | | | | |
|---|---|---|---|---|---|
| ❑ | May 30 | Atlanta, GA - Crowne Plaza Ravinia | ❑ | June 27 | Morristown, NJ - Headquarters Plaza Hotel |
| ❑ | May 31 | Washington, DC - Crystal Gateway Marriott | ❑ | June 28 | Chicago, IL - Rosemont Suites |
| ❑ | June 3 | New York, NY - Doubletree Guest Suites | ❑ | July 23 | Philadelphia, PA - Doubletree Guest Suites/Plymouth Meeting |
| ❑ | June 4 | Boston, MA - Royal Sonesta | ❑ | July 25 | Dallas, TX - To Be Announced |
| ❑ | June 11 | Irvine, CA - Radisson Plaza Hotel | ❑ | August 5 | Denver, CO - To Be Announced |
| ❑ | June 18 | Seattle, WA - Sheraton Seattle | ❑ | August 7 | Minneapolis, MN - To Be Announced |
| ❑ | June 19 | San Francisco, CA - ANA Hotel | ❑ | August 8 | Cincinnati, OH - To Be Announced |

## Method of Payment (payment is due prior to seminar date)

**Course Fee**
Course fee includes seminar, course materials, luncheon and morning and afternoon refreshments.
**Intranets: Technologies, Tools & Strategies**

Number of Registrants _____ x $395 =
$_____ Total Fee

❑ Check Enclosed
*(Check made payable to Network World, Inc.)*

❑ Invoice my company
**(Copy of signed purchase order must be enclosed or faxed)**

❑ Bill my credit card
❑ MasterCard ❑ VISA ❑ American Express

Account Number _____

Expiration Date _____

Name on Card _____

Signature _____

## 3 Easy Ways to Register:

**Phone . . .**
Our toll-free registration line at
**800-643-4668**
**508-820-7493**
(9:00 A.M. – 5:30 P.M. EST)

**Fax . . .**
THIS FORM TO
**508-820-1283**
(24 HOURS A DAY)

**Mail . . .**
THIS FORM TO
**Network World**
Professional Development Group
161 Worcester Road
Framingham, MA
01701-9172

❑ I am unable to attend. Please send me the complete attendee materials kit for the Intranet Seminar for just $99.95 plus $6.95 for shipping and handling.

NW-TIP

# WANs & Internetworking

**Covering:** Network Architectures and Management • Routers • Muxes, Remote Access Gear, Modems, PBXs and other CPE • Mobile Computing Products

## Briefs

**JFAX Communications, Inc.** *last week announced software and a service that allow users to* **download fax and voice messages** *into their Internet electronic mailboxes. The company boasted that its software should make answering machines and fax machines obsolete. Unique personal JFAX phone numbers that allow Internet delivery of faxes are available in New York, London and Atlanta. Users can sign up for the $12.50 a month service at http://www.jfax.net.*

**Ascom Timeplex** *last week said it has upgraded its* **Synchrony backbone switch** *software with data compression that will boost throughput by 200% to 400%. It also announced the software will support up to 200 frame relay permanent virtual circuits per four-port Synchrony interface board. Ascom Timeplex: (201) 391-9111.*

**Wildfire Communications, Inc.** *last week announced availability of an automated,* **speech recognition-based** *call routing feature for its electronic assistant product. The new Wildfire software also supports five-way conference calls. A server license that supports 40 to 50 users costs about $30,000. Wildfire: (617) 674-1500.*

**Make Systems, Inc.** *has rolled out a service to help users optimize their Network Equipment Technologies, Inc. IDNX networks. NetMaker Solution, available now, helps users create cost-optimal designs of* **IDNX backbones,** *the company said. Make: (415) 941-9800.*

**NCE Computer Group** *has expanded its service and support offerings from repairs and maintenance to include network design, cabling, software conversion and integration, as well as hardware sales, service and installation nationwide. NCE staffers have been trained as* **Certified Novell Engineers** *and hold Microsoft Corp.'s A+ certification. NCE: (619) 452-7974.*

Internetworking

## Starburst shines bright across multicast sky

**By Jim Duffy**
*Boston*

In the financial world, you have to be quick, efficient and frugal to survive.

That goes double for companies that deliver information to the financial world.

*In-Site*

That's why Financial Publishing Co., a developer and disseminator of financial services software and information, implemented a multicast frame relay network. Multicast features one-to-many transmission capabilities, which enable Financial Publishing to rapidly deliver large volumes of data to thousands of people, while saving thousands of dollars a month over traditional transmission techniques, such as electronic file transfer.

"[File Transfer Protocol] by definition is one-to-one" transmission, said Sean McArdle, vice president of Financial Publishing. "If I want to talk to three people, I need three different links," which require associated modem and data service unit/channel service unit (DSU/CSU) hardware.

Multicast requires only one link into the public telephone network, which switches channels from that link to subscriber destinations. This saves on modem and DSU hardware, as well as telecommunications line costs. All Financial Publishing needs is an Intel Corp. Pentium-based PC running Windows NT and Starburst Communications Corp.'s Starburst Multicast software, McArdle said.

Starburst is a Concord, Mass., start-up company.

Multicast is also faster and more reliable, McArdle said. Data can be transmitted to multiple destinations simultaneously, which means all financial institutions and software houses get vital financial data at the same time. With FTP, Financial Publishing could send data to only one destination at a time, McArdle said, which may have given some clients a competitive advantage over others.

Financial Publishing's multicast network is more reliable because the transmissions are self-correcting. Starburst Multicast enables computers at destination sites to know how many frames to expect. If they do not get all of the frames, the missing frames are appended to the end of the file; this minimizes acknowledgment traffic and alleviates the need to resend the entire file.

"The onus of quality control is automated so clients don't even know if there was a [transmission] problem," McArdle said. "No longer do the clients have to check the file to make sure they got what they thought they got. That's been taken care of already."

This capability also enables Financial Publishing's clients to perform "lights out" batch processing of the data, in which manual intervention or supervision is unnecessary. This, in turn, lowers labor and processing costs for those subscribers, McArdle said.

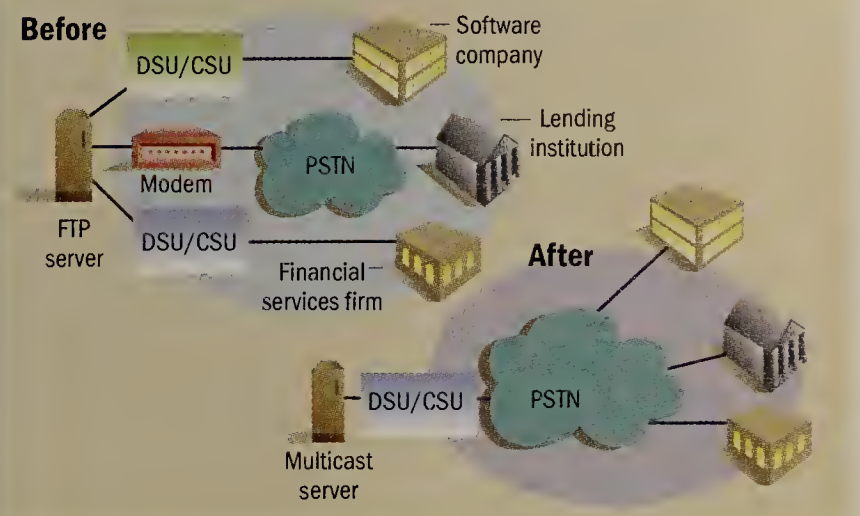
All in all, multicast provides a more efficient use of the network, he said.

"We haven't had a bad transmission yet," he said. "If you're sending identical or similar types of files to a number of places, it's a very elegant solution." ■

**Read up on Internet-based multicasting systems on Network World Fusion. Select News+ then WANs & Internetworking.**
http://www.nwfusion.com

**One to many saves money**

**The one-to-many transmission capabilities of Starburst's multicast file transfer software is saving Financial Publishing equipment and line costs.**




## U.S. Robotics gets into cellular access game

**By Tim Greene**
*Skokie, Ill.*

There is a new name in the arena of wireless data access vendors: U.S. Robotics.

Over the next year, the company will roll out a variety of wireless products, from cellular connections for its hand-held organizer to cellular modem banks for carriers.

During the third quarter, the company will release the first wireless product, Wireless Access System. This module for U.S. Robotics' Total Control Enterprise Network Hub chassis will support access to analog switched cellular networks for data applications, including Internet access, file transfer and electronic mail.

The Wireless Access System consists of back-to-back modem cards that fit in slots in the Total Control Hub. A software gateway within the module bridges cellular traffic pulled down by a carrier cellular switch to the public switched landline telephone network.

Some client products would be offered through Megahertz, the mobile computing division of U.S. Robotics, which makes PC Cards for wireline and wireless connectivity. The company plans to offer PC Cards to support a variety of wireless technologies (see graphic).

U.S. Robotics will also develop a wireless interface and software for Pilot, a handheld organizer from U.S. Robotics' Palm-Computing division. One application for the product might be a device for calling down and screening E-mail. For example, the device could access E-mail over a cellular connection and, using software being developed with third parties, sort out only those messages marked urgent.

Calling down only those messages would reduce the airtime and, therefore, the cost of checking the messages, according to Bill Cole, a product marketing manager for U.S. Robotics.

Cole said pricing has not been set for the Wireless Access System.

The company last week also announced that it would provide Total Control Enterprise Network Hubs to support dial-up access to Pacific Bell's X.25 net.

Primary Access Corp. and AT&T Paradyne make this type of product already. ■

**U.S. Robotics on the air**

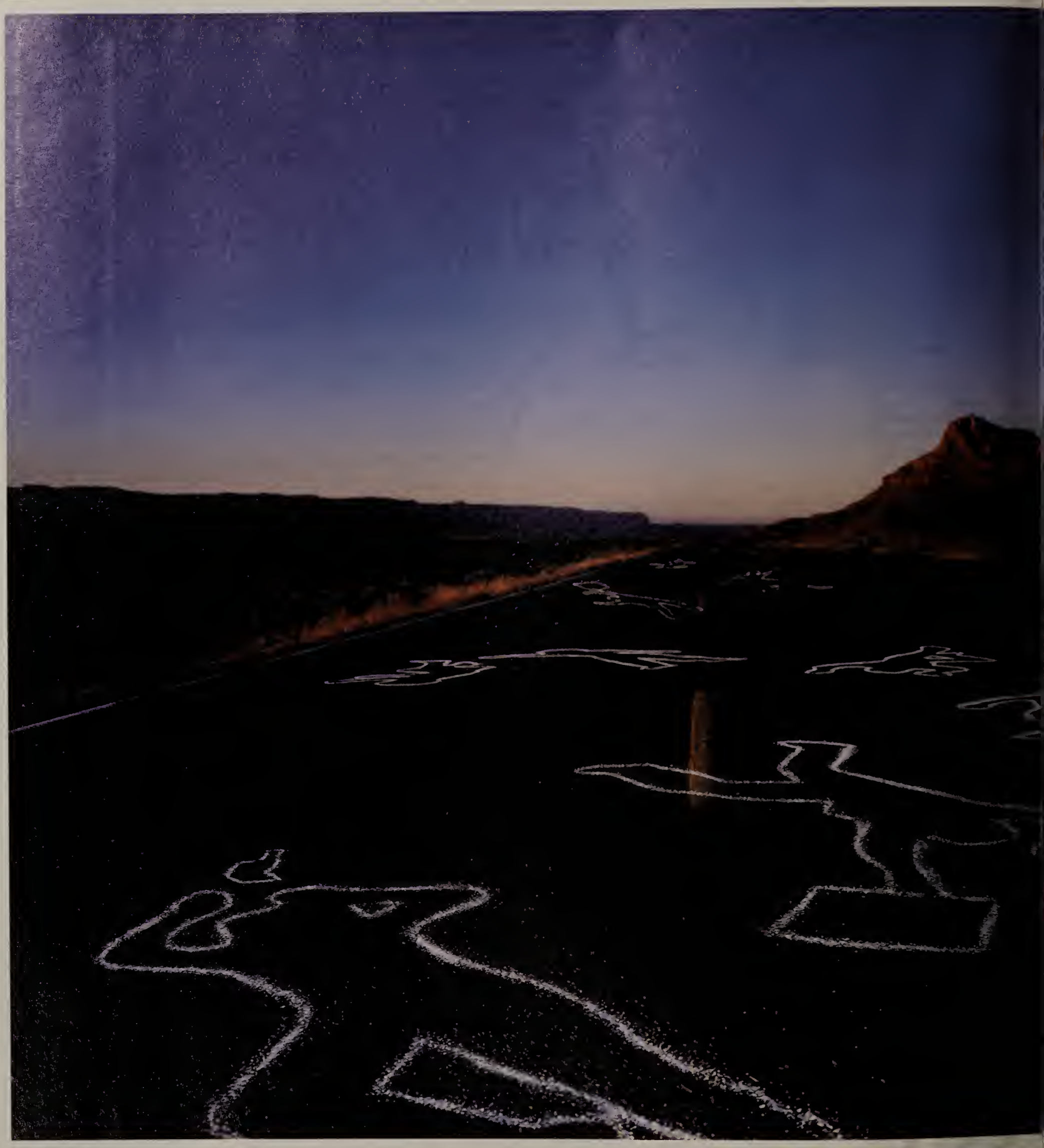
**Cellular products expected from U.S. Robotics over the next year.**

**Client:** U.S. Robotics

- Cellular support for Pilot, U.S. Robotic's handheld electronic organizer
- Will develop PCMCIA cards to support global system for mobile communications (GSM), Code Division Multiple Access (CDMA), Time Division Multiple Access (TDMA) and Cellular Digital Packet Data (CDPD)

**Infrastructure:**

- Modules for the Total Control Enterprise Network Hub that support GSM, CDMA and TDMA. (The company is investigating CDPD cards.)

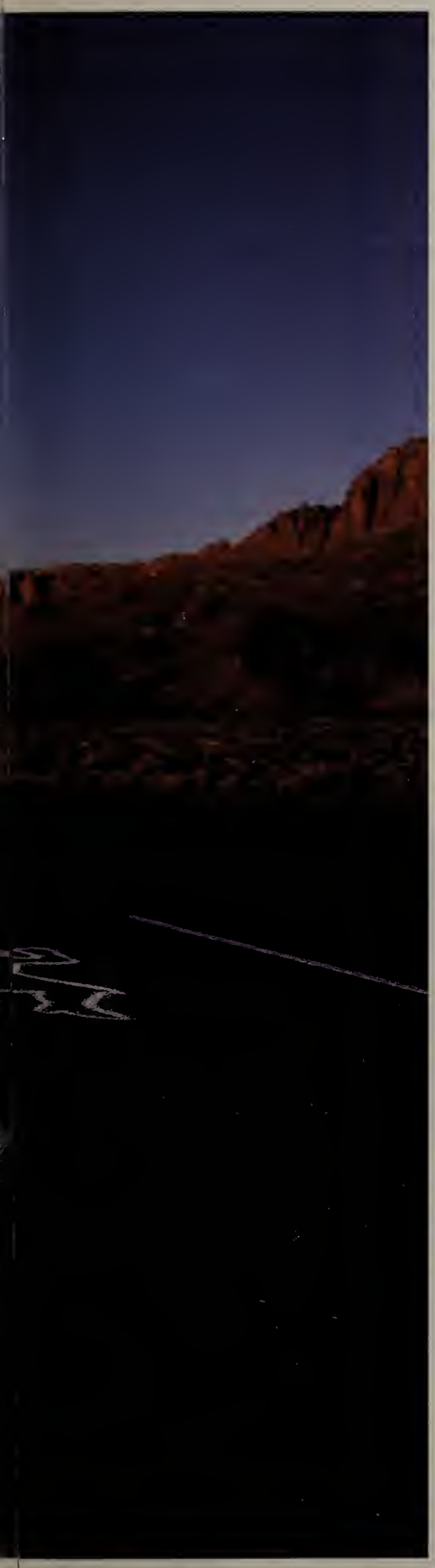


The rush to do business on the Internet is on. The question is, what will ultimately separate the winners from the losers?

A deciding factor will be your alliance with strategic network partners. Alliances that can help you capitalize on all the power the Internet has to offer. And when it comes to the Internet, there is no better partner than the people of Cisco Systems.

We didn't just arrive on the information highway yesterday. In fact, we're one of the pioneers who helped create the Internet.

Almost every message that travels over the Internet moves through Cisco equipment. And our Cisco IOS™ software is the core technology that empowers different hardware devices on the Internet to communicate with each other regardless



# The Information Highway Is Paved With Rhetoric, Metaphors, And The Scar Tissue Of Misinformed Executives.

of their make or brand name, ensuring smooth, secure communications whether they're going around the corner or the globe.

All of this makes us uniquely able to help you build the type of infrastructure your company needs to employ the Internet for marketing, customer support and most importantly, more sales.

The metaphors, rhetoric and promises will only carry you so far. In the end, experience and expertise will surely take you much farther down the road.

Visit us on the Web at www.cisco.com. Or give us a call at 1-800-778-3632, ext. 159102. We'll help to ensure that your company's trip on the Internet is a safe and profitable journey.

CISCO SYSTEMS

THE NETWORK WORKS. NO EXCUSES.™

*From outside the United States, phone Cisco USA 408-526-7209, Cisco Europe 32-2-778-4242 or Cisco Australia 61-2-9935-4107.*

# Relax, you're on a videoconference

*Lucent aims to build more natural environment through its video switch.*

**By David Rohde**
*Washington, D.C.*

Lucent Technologies, Inc. is attempting to take some of the awkwardness out of videoconferencing in a new release of its multipoint control unit (MCU).

The AT&T spin-off last week announced general availability of Release 4.0 of its MCU, which switches video links in a manner similar to the way a private branch exchange switches telephone calls.

Using a concept it dubs Continuous Presence Plus, Lucent hopes to give its customers a more natural meeting environment than today's conferencing systems where only certain speakers can be seen, or where awkward cuts to different participants occur simply because of coughing or doors slamming.

Lucent officials said the improvement is essential as the company — and its rivals — build video versions of their PBX-based automatic call distributors (ACD), such as Lucent's Definity switch for call centers.

"Our MCU shares most of the circuitry with the Definity architecture," said Marty Welt, Lucent's director of visual networking products. "So we'll be able to use the [MCU] technology as a proving ground for [call center] products we'll be offering in the future."

**BREAKING OLD TIES**

**Snapping another AT&T apron string, Lucent was scheduled to bring up its own Web site late last week (http://www.lucent.com).**

Under traditional video-switching schemes, Welt explained, four or five sites on a conference are designated as the most important, and each appears continuously on the screen. If there are any other sites on the conference, they are only heard, not seen. Alternatively, one site is shown at a time, with the MCU attempting to determine the correct site by deciding who is speaking at the time.

But under Lucent's Continuous Presence Plus, Welt said, up to 24 sites are eligible to appear in the four quadrants of the screen. To determine who should appear, the MCU bases video switching on voice activation rather than so-called voice energy, which can mistake typical grunts and interpolations for real comments.

Release 4.0 of the Lucent MCU also for the first time supports the T.120 data-conferencing standard, which is gaining popularity as a document collaboration specification (*NW*, May 20, page 41).

The Lucent MCU transmits voice, video and data at speeds ranging from 112K to 1920K bit/sec, and supports the H.320 videoconferencing standard.

Prices for the MCU begin at $20,000 for the initial eight ports, although videoconferencing also involves myriad additional costs for facilities, telecommunications links and other factors.

©Lucent: (888) 458-2368.

## BusinessBriefs

**Sahara Networks, Inc.**, a Cheshire, Conn., start-up designing access devices for Asynchronous Transfer Mode networks, last week announced a second round of **private funding** from venture capital firms Bessemer Venture Partners in Wellesley, Mass., and Greylock Venture in Palo Alto, Calif. The two firms were part of the initial capitalizing of the company. Sahara is expected to announce products this summer that will concentrate different types of legacy traffic on high-bandwidth ATM backbones at a price significantly less than current access products.

**SNMP Research, Inc.** has named industry analyst Jill Huntington-Lee **manager of new business development**. Huntington-Lee has 12 years of experience in the computer and data communications industry, most recently as a lead analyst at Datapro Information Services Group in Delran, N.J.

**MAXM Systems Corp.** said it will distribute Micromuse Plc's Netcool/OMNIbus fault management software worldwide. The combination of Netcool/OMNIbus with MAXM's MAX/Enterprise management software will give users **cross-domain event management** of Unix, MVS, Asynchronous Transfer Mode, Simple Network Management Protocol and non-SNMP devices and systems.

MAXM has also reached an OEM agreement with Internet Security Systems to add ISS's Internet Scanner security technology to MAX/Enterprise. Internet Scanner is designed to thwart unauthorized access to corporate intranets from Internet users.

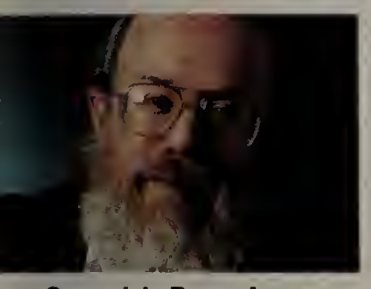
MAXM: (703) 761-0400.

INTERNETWORKING MONITOR

# ATM Year 96 raises question: Is it the end of a dream?

John McQuillan's ATM Year 96 conference a few weeks ago was quite a show and exhibited a not-so-subtle change from the year before.

The attendees went into last year's ATM Year 3 (the predecessor to ATM 96, John having taken marketing pointers from Bill Gates) with the fervor of people going to a revival meeting. The conference was going to be a confirmation of Asynchronous Transfer Mode's progress toward its inevitable destiny as the universal network.



Scott Bradner

However, there was more than a little disquiet in the pews when John said that all was not quite as rosy as some would have you believe.

While the future looked good last year, telephone carriers' use of ATM for voice was not being planned for at the rate necessary to see wide deployment. The attendees, who had come ready to gather up ammunition to take back home and use on the doubters standing in the way of progress, found more blanks than illuminating flares. ATM's future was still in the future — bright and glorious, but still a ways off.

This year, I found the incoming crowd to be of a different mindset — there were more agnostics than believers. More people were coming to find out than were coming to celebrate.

Considering the news from Cisco about the cost of 100M bit/sec Ethernet switches (very cheap) and from others about the potential for near-term availability of gigabit Ethernet, fact-finding was a good mode to be in.

Not that there wasn't a lot of good news about ATM and impressive ATM equipment on the show floor. Dozens of talks reported on successful ATM trials, progress in ATM standards, security and ATM, new ATM hardware and managing ATM networks. ATM is clearly a technology in the midst of dynamic development with great potential.

Despite the abundance of positive news, I think that by the end of the conference, the majority of the attendees would have answered somewhere between "could be" and "yes" to the question John asked that Thursday noon at the conference: "Has ATM lost the desktop?"

This premature death, or, at the very least, significantly delayed adolescence, of ATM to the desktop comes not just from the slower-than-anticipated development of ATM standards. It also comes from the unexpected strength of the competition.

Ethernets are familiar technology at many sites. A 100M bit/sec version of the same technology, running over the same wires, is an easier sell than an entirely new concept.

Now that the cost of 100M bit/sec Ethernet is plummeting (soon to be about the same as 10M bit/sec Ethernet), and with the realization that raw speed can solve many of the multimedia support issues ATM was touted as addressing, ATM is becoming harder to justify.

During my session, "A Conversation with Paul Mockapetris," Paul said he thought the ATM Forum (and by implication, ATM as a whole) had "lost the dream."

Mockapetris is the former chairman of the IETF who also handed out quite a bit of money for ATM research while at DARPA.

ATM once was this dream of ubiquity; ATM sea to shining sea and beyond. All would be possible in this dream — from blinding-fast data transfer to integrated voice, video and data services. Vast cost savings would be achieved by avoiding the requirement for separate parallel networks and parallel separate network support operations.

Some still have this dream, but to me, it is wishful thinking. There is no magic technology.

In a way, it is sad to see this dream begin to evaporate in the light of day. Purity of mission can be a great motivator, but the reality is that technology is always changing. The dream should be the continued evolution of capabilities workable across many environments, thus opening up the dream rather than restricting it to a technology island we will quickly pass by.

Disclaimer: Harvard accepts no purity before its time (which can be a long time coming). But the judgment of purity, or lack of it, contained herein is mine.

*Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.*

# THIS IS A MIDRANGE SERVER.

*The AlphaServer 4100*

*400MHz Alpha processor*

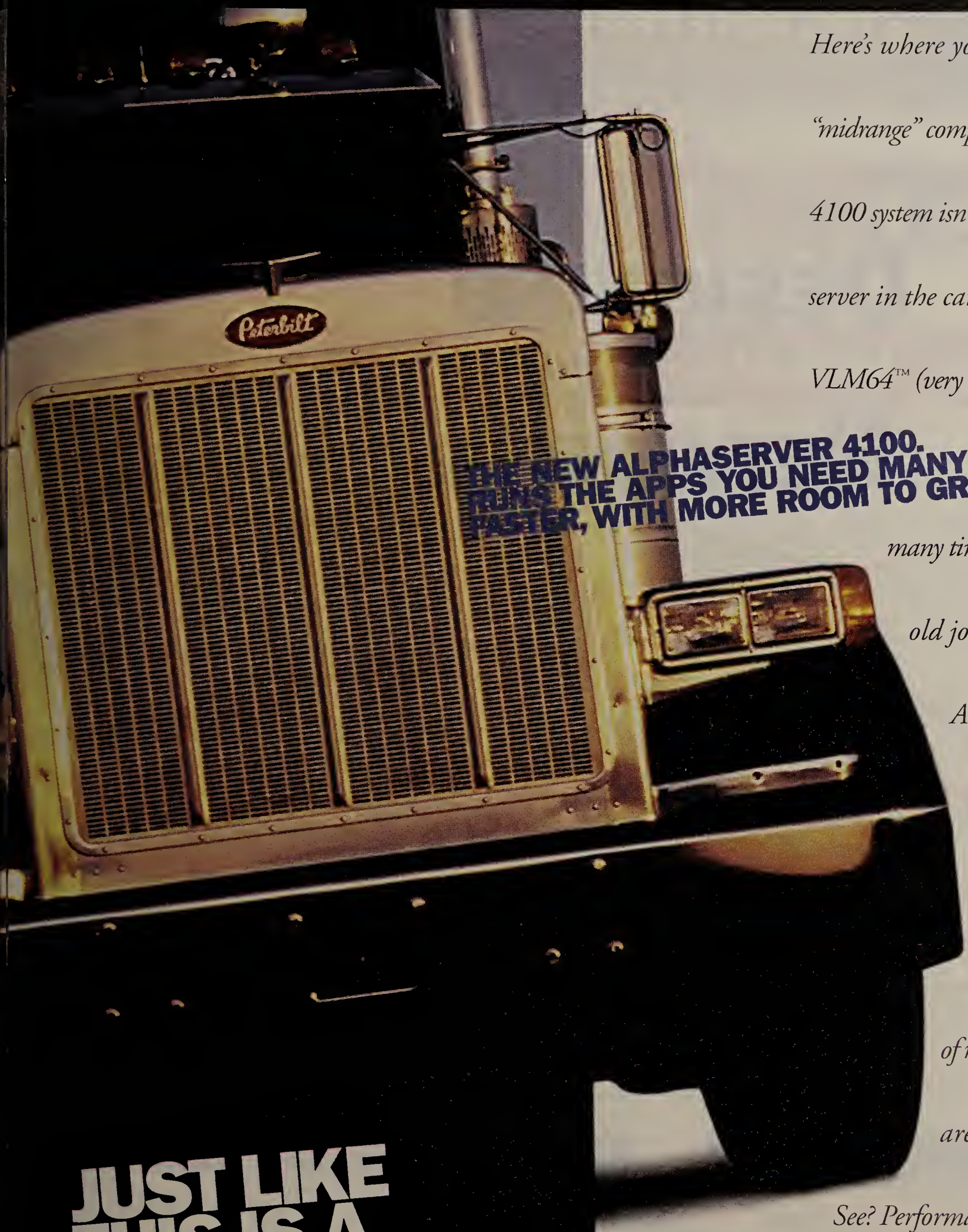
*4GB VLM™ (very large memory)*

*64-bit PCI*

*6,056 tpmC at $223/tpmC*

*I/O Bandwidth 500MB/sec.*

*Available in pedestal or rack-mount*




# JUST LIKE THIS IS A MIDSIZE CAR.

## THE NEW ALPHASERVER 4100. RUNS THE APPS YOU NEED MANY TIMES FASTER, WITH MORE ROOM TO GROW.

*Here's where you forget your old notions about "midrange" computing. Digital's new AlphaServer™ 4100 system isn't middling in any way. It's the only server in the category that's fully 64-bit, that has VLM64™ (very large memory). Which means it can run your applications many times faster, so you won't just be doing old jobs quicker, you'll do new things. And it runs Windows NT,™ Digital UNIX® and OpenVMS,™ so your choice of applications is huge, plus its modular design gives you plenty of room to grow. Yet price/performance are way below what you'd expect. See? Performance is higher, cost is lower, it's not in the middle of anything. For more, call a Digital Business Partner, call us at 1-800-DIGITAL (press 4) or visit our Web site at http://www.digital.com/info/alphaserver.*

digital™

WHATEVER IT TAKES℠

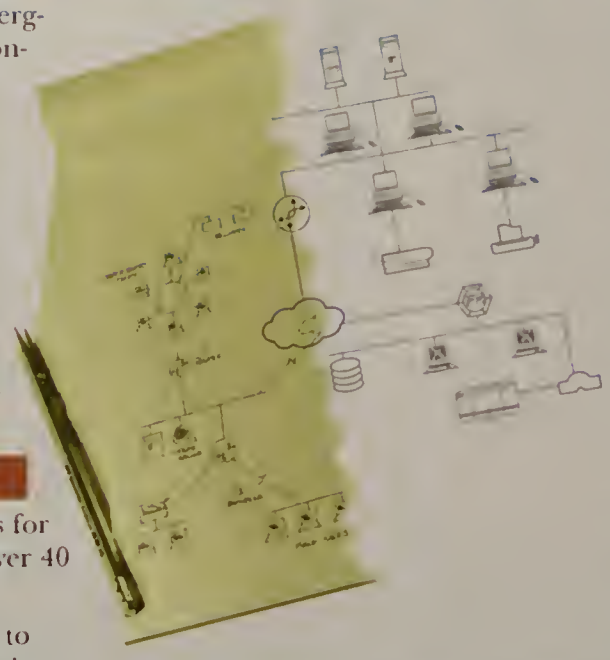
NetworkWorld
TECHNICAL SEMINARS

**NEW Dates Added!** See Below

# Internetworking: DESIGNING LANs, WANs & BROADBAND NETWORKS

The ever-changing internetworking landscape, fueled by emerging broadband technologies, dramatically challenges traditional LAN and WAN architectures. Network professionals must now integrate local and wide-area networks with new technologies including fast Ethernet, ATM, frame relay and SMDS. These and other new technologies hold the promise of more efficient and ever-faster communications across enterprise networks.

Directed and taught by Mark Miller, author of seven best-selling books on internetworking technologies, this seminar will teach you how to architect and implement multiprotocol, multioperating system internetworks that seamlessly integrate legacy and emerging technologies.



**This information-packed two-day seminar will help you...**

- Evaluate internetworking hardware and software solutions for optimum network design and performance, and review over 40 available products
- Analyze repeaters, bridges, switches, routers and gateways to determine which one is appropriate for particular applications
- Prepare for the next generation of internetworking challenges: Frame relay/SMDS, frame relay/ATM and SMDS/ATM connections
- Troubleshoot your environment through case studies that detail protocol operation, and illustrate typical internetworking problems and solutions, including Ethernet fragments, the token ring route discovery process, and FDDI station management
- Understand the key internetworking features of AppleTalk, Banyan VINES, NetWare, OS/2 LAN Server and Windows NT
- Discover some key applications for narrowband ISDN technology
- Compare the technologies and operation of ATM, frame relay and SMDS, and discover the role of the broadband implementers: the Frame Relay Forum, the ATM Forum and the SMDS Interest Group
- Understand the detailed operation of Ethernet, IEEE 802.3, token ring and FDDI, and key performance characteristics of these technologies
- Evaluate the differences between Transparent Bridging, Source Routing and Source Routing Transparent Bridging internetworking standards
- Utilize available software tools in the network optimization and modeling process
- Examine application gateways that connect LANs minicomputers and legacy systems
- Understand key internetworking protocols, such as TCP/IP, IPX/SPX, X.25 and XNS
- See how SNMP plays a key role in internetwork management including the management and operation of broadband networks
- Match the appropriate LAN application with the WAN broadband technology
- Understand the operation of IP-based routing
- Understand TCP/IP and the Internet protocol suite, including ARP, ICMP, UDP, SMTP, TELNET and FTP
- Explore the internetworking challenges of remote access
- Determine bandwidth requirements for both leased line and broadband circuits utilizing traffic studies

## Locations and Dates

| | | | |
|---|---|---|---|
| Boston, MA | May 14-15 | New York, NY | Sept. 11-12 |
| San Francisco, CA | June 11-12 | Washington, DC | Oct. 8-9 |
| Bridgetown, Barbados | June 25-26 | Chicago, IL | Sept. 24-25 |
| Dallas, TX | July 23-24 | Atlanta, GA | Oct. 22-23 |
| San Jose, CA | July 30-31 | Boston, MA | Nov. 6-7 |
| St. Louis, MO | Aug. 6-7 | Seattle, WA | Nov. 12-13 |
| Irvine, CA | Aug. 20-21 | San Francisco, CA | Dec. 5-6 |


## $895 Registration Fee includes:

- ★Comprehensive seminar workbook
- ★Copy of best-selling *Internetworking*, 2nd edition, by Mark A. Miller
- ★Four exclusive protocol reference guides: Ethernet, Token Ring, FDDI and LAN Cabling
- ★Valuable course diskette containing reference information on internetworking implementation, documentation and standards
- ★Free 6-issue subscription to *Broadband Networking News* — the leading newsletter for news and analysis on broadband networks

Broadband Networking News
Business News & Analysis of Frame Relay, ATM and SMDS

- ★Luncheon and break refreshments

**REGISTER EARLY! Attendance is limited!**

**Web/E-Mail** Information
Obtain full seminar information and register on-line in the Professional Development Group section of our Web site at:
**www.nwfusion.com**
OR receive full seminar information via e-mail by sending a request to:
**seminars@nww.com**
Please put the word "LAN" in the subject field.

**Call 1-800-643-4668**
**Register today for the seminar nearest you!**

Dial Our **FAX-BACK** Information Line at
**1-800-756-9430**
for a complete seminar outline and registration form.
When prompted, request document #80.

**Official Sponsors**

NCR
ALCATEL DATA NETWORKS
proteon network with the pro

# APPLICATION FOR FREE SUBSCRIPTION

**Yes! I want my FREE subscription to *NetworkWorld*.** ❑ No, Thank You.

Sign here

Signature _____ Date _____

**Qualify:** You must supply your company name and address.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Business phone (_____) _____

Business FAX (_____) _____

Internet address _____

# NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

❑ My home address is also my business address.

**Optional delivery address:**
Enter your home address below if your company will not accept delivery at your business address:

Street address _____ City _____ State _____ Zip _____

If military, please specify branch and base: _____

If government, please specify division: _____

Publisher reserves the right to serve only those individuals who meet publication qualifications. Incomplete forms will not be processed.

9501

## 1 Industry: (check one only)

1. ☐ Manufacturers (other)
2. ☐ Finance/Banking
3. ☐ Insurance/Real Estate/Legal
4. ☐ Health Care Services
5. ☐ Hospitality/Entertainment/Recreation
6. ☐ Media/TV/Cable/Radio/Print
7. ☐ Retail/Wholesale Trade/Business Services
8. ☐ Transportation
9. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consultants (Independent)
16. ☐ Carriers/Interconnects
17. ☐ Manufacturers (Computer/Communications)
18. ☐ Resellers of Computer/Network Products (VARs, VADs, Distributors)
19. ☐ Systems/Network Integrators
20. ☐ Distributors (Computer/Communications)
21. ☐ Other *(please specify)* _____

## 2 What is your job function? (check one only)

**NETWORK IS MANAGEMENT:**

- ☐ Networking Management
- ☐ LAN Management
- ☐ Datacom/Telecom Management
- ☐ IS, IT, MIS, Systems Management
- ☐ Engineering Management

6. ☐ Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management)
7. ☐ Consultant (Independent)
8. ☐ Other *(please specify)* _____

## 3 What is the total number of sites for which you have purchase influence? (check one only)

☐ 100+ ☐ 50 - 99 ☐ 20 - 49 ☐ 10 - 19 ☐ 2 - 9 ☐ 1 ☐ None

## 4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

**A. SCOPE** (check one only)
- ☐ Corporate/Enterprise
- ☐ Department
- ☐ None

**B. INVOLVEMENT** (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

## 5 Check ALL that apply in Columns A and B:

**A. I am involved in the purchase of the following products/services:**
**B. I plan to purchase the following products/services:**

| | B | |
|---|---|---|
| 100 | ❑ | **LOCAL-AREA NETWORKS** |
| 01. | ☐ | Local-Area Networks |
| 02. | ☐ | Network Op. Sys. Software |
| 03. | ☐ | LAN Storage/Backup |
| 04. | ☐ | Optical LAN Storage/Backup |
| 05. | ☐ | Disk LAN Storage/Backup |
| 06. | ☐ | Tape LAN Storage/Backup |
| 07. | ☐ | RAID LAN Storage/Backup |
| 08. | ☐ | Network Test/Diagnostic Tools |
| 09. | ☐ | Cables, Connectors, Baluns |
| 10. | ☐ | UPS |
| 11. | ☐ | Network Interface Cards |
| 12. | ☐ | Peer-to-Peer LANs |
| 13. | ☐ | SNMP Network Management |
| 14. | ☐ | ATM Switches |
| 15. | ☐ | Token-Ring Switches |
| 16. | ☐ | Ethernet Switches |
| 17. | ☐ | Remote LAN Access/Communications Servers |
| 18. | ☐ | Superservers |
| 19. | ☐ | File/Application Servers |
| 20. | ☐ | Print Servers |
| | B | |
| 101 | ❑ | **INTERNETWORKING** |
| 21. | ☐ | Bridges |
| 22. | ☐ | Routers |
| 23. | ☐ | Bridge/Router |
| 24. | ☐ | Gateways |
| 25. | ☐ | Intelligent Hubs/Stackables |
| | B | |
| 102 | ❑ | **COMPUTERS/PERIPHERALS** |
| 26. | ☐ | Laptops/Notebooks/Sub-Notebooks |
| 27. | ☐ | Micros/PCs |
| 28. | ☐ | Minis |
| 29. | ☐ | Mainframes |
| 30. | ☐ | Workstations |
| 31. | ☐ | Terminals |
| 32. | ☐ | Printers |
| 33. | ☐ | Cluster Controllers |
| 34. | ☐ | Monitors |
| 35. | ☐ | Fax/Modem Boards |
| | B | |
| 103 | ❑ | **REMOTE/WIRELESS COMPUTING** |
| 36. | ☐ | PDAs |
| 37. | ☐ | PCMCIA Devices |
| 38. | ☐ | Wireless Data Services |
| 39. | ☐ | Wireless Data Equipment |
| 40. | ☐ | Wireless LANs |
| 41. | ☐ | Cellular Equipment & Services |
| | B | |
| 104 | ❑ | **INTERNET/ELECTRONIC COMMERCE** |
| 42. | ☐ | Internet Access Providers |
| 43. | ☐ | Firewalls |
| 44. | ☐ | Web Servers/Browsers |
| 45. | ☐ | Internet Software Tools |

| | A | B | |
|---|---|---|---|
| | ❑ | ❑ | **SOFTWARE/APPLICATIONS** |
| 46. | ☐ | ☐ | Network Management |
| 47. | ☐ | ☐ | Systems Management |
| 48. | ☐ | ☐ | Security |
| 49. | ☐ | ☐ | Communications Software |
| 50. | ☐ | ☐ | Terminal Emulation |
| 51. | ☐ | ☐ | Word Processing |
| 52. | ☐ | ☐ | Operating Systems |
| 53. | ☐ | ☐ | Client/Server Applications Development |
| 54. | ☐ | ☐ | Database Management/RDBMS |
| 55. | ☐ | ☐ | Spreadsheet |
| 56. | ☐ | ☐ | Groupware |
| 57. | ☐ | ☐ | EDI |
| 58. | ☐ | ☐ | E-mail |
| 59. | ☐ | ☐ | Windows/Graphical User Interface |
| 60. | ☐ | ☐ | Multimedia |
| 61. | ☐ | ☐ | Graphics/DTP |
| 62. | ☐ | ☐ | Remote Access |
| 63. | ☐ | ☐ | Imaging |
| 64. | ☐ | ☐ | Suites |
| 65. | ☐ | ☐ | Middleware |
| 66. | ☐ | ☐ | Document Management |
| 67. | ☐ | ☐ | Database Server |
| 68. | ☐ | ☐ | Site Metering Tools |
| 69. | ☐ | ☐ | Computer-Integrated Telephony (CIT) |
| | A | B | |
| 106 | ❑ | ❑ | **WIDE-AREA NETWORK EQUIPMENT & SERVICES** |
| 70. | ☐ | ☐ | Frame Relay Equip./Services |
| 71. | ☐ | ☐ | Modems |
| 72. | ☐ | ☐ | FT-1/T-1/T-3 Multiplexers |
| 73. | ☐ | ☐ | FT-1/T-1/T-3 Services |
| 74. | ☐ | ☐ | SONET |
| 75. | ☐ | ☐ | Inverse Multiplexers |
| 76. | ☐ | ☐ | SMDS |
| 77. | ☐ | ☐ | Asynchronous Transfer Mode |
| 78. | ☐ | ☐ | Diagnostic/Test Equipment |
| 79. | ☐ | ☐ | DSU/CSU |
| 80. | ☐ | ☐ | VSAT/Satellite |
| 81. | ☐ | ☐ | ISDN Equipment & Services |
| 82. | ☐ | ☐ | PBXs |
| 83. | ☐ | ☐ | Voice Mail/Response |
| 84. | ☐ | ☐ | Videoconferencing |
| 85. | ☐ | ☐ | Leased Lines |
| 86. | ☐ | ☐ | Switched Data |
| 87. | ☐ | ☐ | E-mail/On-line Services |
| 88. | ☐ | ☐ | 800/900/MTS Services |
| 89. | ☐ | ☐ | Virtual Networks |
| 90. | ☐ | ☐ | Outsourcing/Systems Integration Services |
| 91. | ☐ | ☐ | Education/Training Services |
| 92. | ☐ | ☐ | None of the above (1-91) |

B1 0596

## 6 What is the total number of LANs, workstations/nodes at this location/in your organization?

| At this location: LANs | | Workstations/Nodes | Entire organization: LANs | | Workstations/Nodes |
|---|---|---|---|---|---|
| 1. | ☐ 5,000+ | ☐ | 1. | ☐ 5,000+ | ☐ |
| 2. | ☐ 1,000 - 4,999 | ☐ | 2. | ☐ 1,000 - 4,999 | ☐ |
| 3. | ☐ 100 - 999 | ☐ | 3. | ☐ 100 - 999 | ☐ |
| 4. | ☐ 50 - 99 | ☐ | 4. | ☐ 50 - 99 | ☐ |
| 5. | ☐ 10 - 49 | ☐ | 5. | ☐ 10 - 49 | ☐ |
| 6. | ☐ 1 - 9 | ☐ | 6. | ☐ 1 - 9 | ☐ |

## 7 Check ALL that apply in Columns A and B:

**A. The following network platforms are currently installed:**
**B. The following network platforms are planned for purchase:**

| A | B | | |
|---|---|---|---|
| 55 | ❑ | ❑ | **NETWORK ARCHITECTURES** |
| 01. | ☐ | ☐ | SNA |
| 02. | ☐ | ☐ | DECnet |
| 03. | ☐ | ☐ | TCP/IP |
| 04. | ☐ | ☐ | Novell IPX/SPX |
| 05. | ☐ | ☐ | APPC/APPN/LU 6.2 |
| 06. | ☐ | ☐ | NETBIOS |
| 07. | ☐ | ☐ | AppleTalk |
| 08. | ☐ | ☐ | NFS |
| 09. | ☐ | ☐ | Other *(please specify)* _____ |
| 56 | ❑ | ❑ | **NETWORK OPERATING SYSTEM** |
| 10. | ☐ | ☐ | Microsoft (LAN Manager) |
| 11. | ☐ | ☐ | Novell (NetWare 2.X, 3.X) |
| 12. | ☐ | ☐ | Novell (NetWare 4.X) |
| 13. | ☐ | ☐ | Windows NT |
| 14. | ☐ | ☐ | Windows NT/Advanced Server |
| 15. | ☐ | ☐ | LocalTalk (AppleTalk) |
| 16. | ☐ | ☐ | Banyan (VINES) |
| 17. | ☐ | ☐ | IBM (LAN Server) |
| 18. | ☐ | ☐ | IBM (PC LAN Program) |
| 19. | ☐ | ☐ | Artisoft (LANtastic) |
| 20. | ☐ | ☐ | Digital (Pathworks) |
| 21. | ☐ | ☐ | Other *(please specify)* _____ |

| A | B | | |
|---|---|---|---|
| 57 | ❑ | ❑ | **LAN ENVIRONMENT** |
| 22. | ☐ | ☐ | 4M Token Ring |
| 23. | ☐ | ☐ | 16M Token Ring |
| 24. | ☐ | ☐ | Ethernet |
| 25. | ☐ | ☐ | 100M Ethernet |
| 26. | ☐ | ☐ | StarLAN |
| 27. | ☐ | ☐ | FDDI |
| 28. | ☐ | ☐ | LocalTalk |
| 29. | ☐ | ☐ | 10Base-T |
| 30. | ☐ | ☐ | ATM |
| 31. | ☐ | ☐ | Other *(please specify)* _____ |
| 58 | ❑ | ❑ | **COMPUTER OPERATING SYSTEM** |
| 32. | ☐ | ☐ | DOS |
| 33. | ☐ | ☐ | Unix/Xenix/AIX |
| 34. | ☐ | ☐ | OS/2 |
| 35. | ☐ | ☐ | OS/2 Warp |
| 36. | ☐ | ☐ | IBM MVS |
| 37. | ☐ | ☐ | IBM VM |
| 38. | ☐ | ☐ | Digital VMS |
| 39. | ☐ | ☐ | Macintosh |
| 40. | ☐ | ☐ | Windows |
| 41. | ☐ | ☐ | Windows 95 |
| 42. | ☐ | ☐ | X Window System |
| 43. | ☐ | ☐ | Solaris |
| 44. | ☐ | ☐ | Other *(please specify)* _____ |
| 45. | ☐ | ☐ | None of the above (1-44) |

## 8 For which areas outside of North America do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

## 9 Do you have or plan to install client/server networks? ☐ Yes ☐ No

## 10 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

| | Mainframes A – Installed | Mainframes B – Planned | | Minis C – Installed | Minis D – Planned |
|---|---|---|---|---|---|
| 1. | IBM ☐ | ☐ | 1. IBM | ☐ | ☐ |
| 2. | Amdahl ☐ | ☐ | 2. Digital | ☐ | ☐ |
| 3. | Cray ☐ | ☐ | 3. Tandem | ☐ | ☐ |
| 4. | Hitachi ☐ | ☐ | 4. Unisys | ☐ | ☐ |
| 5. | Unisys ☐ | ☐ | 5. AT&T GIS | ☐ | ☐ |
| | | | 6. HP | ☐ | ☐ |
| | | | 7. Data General | ☐ | ☐ |

**Which of the following do you have installed/planned:** (USE NUMBERS ONLY)

| | At this location: E – Servers | At this location: F – Clients/Nodes | Entire organization: G – Servers | Entire organization: H – Clients/Nodes |
|---|---|---|---|---|
| 1. Power PC | | | | |
| 2. Power Macintosh | | | | |
| 3. Macintosh (Other) | | | | |
| 4. Pentium-based | | | | |
| 5. 80486-based | | | | |
| 6. 80386-based | | | | |
| 7. 80286-based | | | | |
| 8. RISC-based workstations | | | | |
| 9. Other | | | | |

## 11 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

01. ☐ $100 million or more
02. ☐ $50 million - $99.9 million
03. ☐ $25 million - $49.9 million
04. ☐ $20 million - $24.9 million
05. ☐ $10 million - $19.9 million
06. ☐ $5 million - $9.9 million
07. ☐ $1 million - $4.9 million
08. ☐ $500,000 - $999,999
09. ☐ $250,000 - $499,999
10. ☐ $249,999 or less
11. ☐ None of the above

## 12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ $10 billion or more
2. ☐ $1 billion to $9.9 billion
3. ☐ $500 million to $999.9 million
4. ☐ $100 million to $499.9 million
5. ☐ $50 million to $99.9 million
6. ☐ $10 million to $49.9 million
7. ☐ $5 million to $9.9 million
8. ☐ $4.9 million or less
9. ☐ None of the above

## 13 Estimated number of employees at this location/in entire organization:

| At this location: | | | | Entire organization: | | | |
|---|---|---|---|---|---|---|---|
| 1. | ☐ Over 10,000 | 4. | ☐ 1,000 - 2,499 | 1. | ☐ Over 10,000 | 4. | ☐ 1,000 - 2,499 |
| 2. | ☐ 5,000 - 9,999 | 5. | ☐ 500 - 999 | 2. | ☐ 5,000 - 9,999 | 5. | ☐ 500 - 999 |
| 3. | ☐ 2,500 - 4,999 | 6. | ☐ 499 or less | 3. | ☐ 2,500 - 4,999 | 6. | ☐ 499 or less |

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO 1752 NORTHBROOK IL

POSTAGE WILL BE PAID BY ADDRESSEE

NetworkWorld
THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

PO BOX 3091
NORTHBROOK IL 60065-9928

2. FOLD HERE & MAIL TODAY

3. PLEASE TAPE HERE

1. FOLD HERE & MAIL TODAY

# Carrier Services

**Covering:** Local and Long-Distance Services • Value-Added Networks • Cable, Satellite and Wireless Networks • Regulatory Affairs • Carrier-Based Internet Services

## Briefs

■ **Tele-Communications, Inc. (TCI)** *has filed a motion with the Federal Communications Commission to delay* **Pacific Bell's** *San Jose, Calif.,* **1,000-home cable television trial.** *TCI has requested that the Bell company wait to proceed until it has received certification as an open video system, as per the Telecommunications Act of 1996. The FCC, though, is still finalizing rules on such certification.*

■ *The* **Concert** *venture of MCI Communications Corp. and British Telecommunications plc last week introduced Concert Conferencing Services, which will be integrated with the venture's Software-Defined Network offering, called Virtual Network Services (VNS).*

*The first* **joint conferencing** *service is Concert Audioconferencing, which allows VNS customers the same voice conferencing features and integrated billing in all Concert service areas.*

■ **Southern New England Telephone Co.** *will no longer* **round up long-distance calls** *to the next minute for billing purposes, if it receives permission from the Connecticut Department of Public Utilities. The minimum billing will be for 18 seconds even if the call is shorter. Beyond that, bills will be charged to the second.*

■ **AT&T** *last week said it has registered more than 150,000 users for its WorldNet* **dial Internet service** *in the nine weeks since it became available. WorldNet Vice President Tom Evslin said a six-week backlog in service provisioning should be alleviated next month.*

*He also said the company will begin distributing Version 2.0 of Netscape Communications Corp.'s Navigator browser June 15 in 16- and 32-bit editions and will begin selling Macintosh client software in early summer.*

# Government managers nab easier 'Net access

**By David Rohde**
*Washington, D.C.*

Government network managers may find it cheaper and easier to get 'Net connections now that MCI Communications Corp., AT&T and four other Internet service providers (ISP) have won listings on the federal government's schedule for streamlined procurement.

MCI and AT&T head the list of ISPs recently approved under the General Services Administration's Federal Supply Schedule, popularly known as the GSA schedule.

Buying off the GSA schedule, though not always required of government buyers, allows purchasing officers to be certain of meeting applicable regulations. And they can save money.

"It also eliminates the need for individual procurements," often an arduous task in government, according to Chuck Brock, executive national accounts manager for MCI's Government Markets division.

The other approved ISPs are BBN Planet, BTG, Inc., Erols Internet Services, and Service and Technology Micro Systems, Inc. But the list lacks some of the biggest players in the ISP field, some of which are awaiting a firmer government Internet market to develop.

"Government business is a relatively small portion of our customer base," said Brian Muys, a spokesman for PSINet, Inc. in Herndon, Va. Many government agencies take a long time to get approval for a purchase, Muys said. "By the time they're actually budgeted to procure for service, the technology has changed," he added.

And although the GSA schedule eases matters for the buyers, a GSA schedule listing can complicate things for the vendors because they must comply with a variety of special requirements.

But Alan Taffel, vice president of sales and marketing at UUNET Technologies, Inc., told *Network World* the company is actively pursuing a GSA listing. "We expect to be listed in the next 30 to 60 days," Taffel said.

MCI's recent GSA approval gives government network managers the option of purchasing the carrier's dedicated access offering, dubbed internetMCI Direct Connect Access, at a discount. The rates are 15% below commercial rates throughout MCI's entire range of port speeds, from 64K to 45M bit/sec (see graphic).

MCI gives network managers in the private sector the same 15% discount if they make a one-year commitment to the service, Brock said. By contrast, GSA buyers get the lower rates and can still cancel the service at any time with 30-days notice.

AT&T won approval for its Internet offerings just last week, and an announcement is expected soon, according to a GSA official. ■

### Taxpayers save a bit

**Port charges for commercial buyers of internetMCI Direct Connect Access vs. government buyers using the GSA schedule:**

| Port speed (bit/sec) | Monthly commercial price | Monthly GSA price |
|---|---|---|
| 64K | $1,000 | $850 |
| 128K | $1,500 | $1,275 |
| 256K | $1,700 | $1,445 |
| 512K | $2,000 | $1,700 |
| 1.5M | $2,300 | $1,955 |
| 3M | $6,000 | $5,100 |
| 4.5M | $8,000 | $6,800 |
| 10M | $15,000 | $12,750 |

Also available to GSA buyers are 45M bit/sec ports that range from $8,000 to $55,000,depending on average utilization. Access circuits to the MCI ports are available at 5% below MCI's standard government access tariff.

SOURCE: MCI GOVERNMENT MARKETS, MCLEAN, VA.

# Multinationals get south-of-the-border option

**By Joanie Wexler**
*Boston*

A carrier has gone to bat for U.S. multinationals in the expensive and highly regulated South American market.

Telecom South America last week became the first carrier to provide Fortune 1000 companies with telecommunications and systems integration services throughout Central and Latin America. Until now, businesses have had to negotiate with carriers in each country.

The Santiago, Chile-based company has for 15 years provided intercountry services south of the border. Last week, it made its debut in the U.S. with an eye toward connecting U.S. companies to its Santiago hub, then completing connections all the way to user desktops in southern countries. All services can be put on one bill in U.S. dollars, said Karl Faller, Telecom South America's president.

The South American market has been characterized by a high degree of regulation, except in Chile, and a lack of unity in services and rules among countries. The area "is underdeveloped, and companies have been limping by, looking for some help," said Rosemary Cochrane, principal at Vertical Systems Group, a telecommunications consultancy in Dedham, Mass.

Telecom South America is offering primarily private-line services at 64K bit/sec with some E-1 and E-3 options, as well as Fast Ethernet services in Santiago. Links among Peru, Colombia, Ecuador, Argentina and Brazil are under construction now. Some of those links will be complete this summer, and all are slated to be up in 1997, Faller said.

**Telecom South America's** *Faller*

The company, focused on data services, provides planning, design, implementation and management of WANs from any region in South America to the U.S.; enterprise networks within South America; and enhanced services such as call center management and net management. It also serves as a single point of contact to deal with the various telephone companies in different countries. It will bundle in products from Bay Networks, Inc., Microsoft Corp., PictureTel Corp., StrataCom, Inc. and several other router, PC and switch companies.

Nearly 300 U.S.-based multinationals have operations in that part of the world, according to international telecommunications consulting firm Lynx Technologies, Inc. in Fairfield, N.J.

"But the dilemma has been if the operations are large enough to justify the very high cost of private lines there, particularly between countries," noted Len Elfenbein, president of Lynx. Telephone calls, for example, are several hundred percent more when initiated from South America to the U.S., compared with the other way around.

While Telecom South America does not focus on the switched voice market, in many cases it can provide better data networking rates and voice that travels across leased lines. As an aggregator of capacity from various telephone companies, it offers economies of scale, Faller said.

And frame relay services, which are generally more cost-effective than private lines, have been scarce. They are available in deregulated Chile and parts of Brazil. The carrier, which is "on the street in South America," speaking the language and understanding the culture, can work on the users' behalf to optimize those links where available, Faller said.

He said his company is hoping to provide local services to the likes of AT&T-led WorldPartners and Concert, the MCI Communications Corp.-British Telecommunications plc joint venture. Those organizations aim to offer consistent global networking services but have focused their rollouts in Europe and Asia. ■

## Your Network Needs...

# A *Smooth Switch* to Fast Ethernet


# You Need The ProFAST Switch.

### *ProFast 10/100 Switch*

Your company's ready for 100Mbps Fast Ethernet. But only on high volume network segments. We know, we've got a network, too. That's why D-Link's ProFAST 10/100 Switch delivers both 100Mbps and 10Mbps connectivity. All in the same switch. So your users keep working smoothly and at optimum speed.

### *Smooth Performance*

ProFAST Switches are packed with performance features. You get twice the network bandwidth with full duplex signaling. That's an incredible 200Mbps throughput on Fast Ethernet segments, and 20Mbps on existing segments. You also get store and forward switching, the most reliable method of getting your data where it's going. Fast and error-free.

### *Smooth Integration*

Every ProFAST Switch also features auto-sensing network ports for simple plug and play installation. Plus, you never have to worry about compatibility. Because the ProFAST Switch fully complies with both 10Base-T and 100Base-TX standards.

### *One Smooth Switch*

With superior D-Link quality, reliability and performance, ProFAST is one smooth switch.

For special introductory pricing
on the ProFAST Switch,
call D-Link today!

**1-800-326-1688**

**www.dlink.com**

**D-Link®**

Commitment to Connectivity

# LAN World

**Covering:** Operating systems • LAN management
Hubs • Switches • Adapters and other equipment


## Briefs

■ **ON Technology Corp.** *has released AuditTrack 3.0, a server-based* **auditing tool for NetWare** *LANs that adds native support for auditing Novell Directory Services as well as file and directory monitoring. These capabilities allow administrators to see who is logging on to the network and at what time, who is deleting files and who is playing server-based video games when they are supposed to be working. AuditTrack 3.0 also provides troubleshooting and usage information.*

*The software is available now and priced in license packs for 25 to 1,000 users at $595 to $4,995. AuditTrack supports Windows, Windows 95, Windows NT, Macintosh, DOS, OS/2 and Unix clients using IP, IPX, NETBIOS and AppleTalk protocols.*

*ON Technology: (800) 767-6683.*

■ **Novell, Inc.,** *which last year announced it would tighten up the requirements for* **Certified Novell Engineers (CNE)** *and require all existing CNEs to requalify under the new guidelines, has extended the deadline for recertification. CNEs now have until Aug. 31, rather than June 30, to recertify. Recertification requires CNEs to take one class on migration to NetWare 4 and another on NetWare 4 administration, then pass an exam on that material.*

■ **Syntax, Inc.** *has announced a* **TCP/IP gateway** *that will let NetWare clients on IPX networks access the Internet. The TotalNet Internet Gateway sits on a Solaris or AIX Unix server and includes an HTML interface that lets net administrators limit use of the Internet by time of day and application. It also includes a server-based Windows Socket layer that will let most end users access WinSock-compliant applications without adding winsock.dll to their workstations. Per-seat costs range from $135 for one user to $45 each for 250 seats.*

*Syntax: (206) 838-2626.*

# Getting ready for gigabit Ethernet

Q&A

Gigabit Ethernet products are months away from hitting the market, but the technology has recently become a hot topic in networking circles. Several start-ups, including Mountain View, Calif.-based Rapid City Communications, have emerged with plans to focus exclusively on 1G bit/sec Ethernet products. Senior Writer Jodi Cohen recently spoke to Joe Kennedy, Rapid City's president and chief executive officer (and formerly CEO of Hughes LAN Systems, Inc.) about the gigabit Ethernet market.

Rapid City's *Kennedy*

**How quickly do you expect the gigabit Ethernet market to take off?**

First of all, one should qualify what gigabit Ethernet really means. It will be just another network interface standard, albeit a fast one, based largely on the original 10Base-T work.

Within the IEEE 802.3 group at least, there will be both a full-duplex standard for point-to-point connections and a half-duplex standard that defines the [carrier-sense multiple access with collision detection] operation of a repeater. What we are most often talking about when we say "gigabit Ethernet" is high-capacity 10M/100M bit/sec switches that also support 1000Base-X ports.

Rumor has it that the first of these next-generation switches will be introduced at NetWorld+Interop this fall, with additional products being introduced in the first and second quarters of next year. Since the 802.3 standard is at least some distance out, say 18 to 24 months, any really high-speed ports on such switches will be proprietary stabs at the standard. They, too, will show up as options on these switches in this same time frame.

**Why are so many start-ups popping up in the gigabit Ethernet market? Are they just looking to get acquired by a bigger vendor?**

I suppose that is one hope. But as common as technology acquisitions are today, no start-up can bet on an exit strategy that says you are going to be acquired by one of the marketing behemoths like Cisco or 3Com. This is especially so since it is likely that many of these companies will deem 1000Base-X technology as core and devote internal resources to developing their own solutions.

**With heavyweights such as Intel Corp., 3Com Corp. and Sun Microsystems, Inc. already planning to offer gigabit Ethernet products, how will start-ups be able to compete?**

There will always be room for products that differentiate themselves. While packet switching is hardly a new approach, there is room for lots of improvements. Start-ups are traditionally more focused and less distracted by product support issues, at least for an initial honeymoon, have less backward compatibility limitations and aren't bound by an existing marketing paradigm.

**How successful do you think gigabit Ethernet will be at pushing Asynchronous Transfer Mode out of the LAN backbone?**

This is the $64,000 question. There seems to be an increasingly vocal consensus that ATM to the desktop is dead. Most believe that ATM in the central office is a given. ATM in the backbone has made an initially successful market penetration. But without some compelling reason to continue to the desktop, and especially with a cheaper competitive solution like 1000Base-X, ATM is in trouble.

**What types of products can we expect from Rapid City, and how will pricing compare with Fast Ethernet and ATM products?**

Rapid City is developing high-performance switch technology with support for 1000Base-X. We are not currently interested in half-duplex [repeater] products, adapter products or other interfaces.

As far as pricing goes, if initial 1G bit/sec switch ports cost in the $3,000 to $4,000 range, and with 100Base-FL [fiber] switched ports going for at least $1,500 now, I guess you could say that 1000Base-FL would offer 10 times the performance at two to three times the cost.

From the ATM/Ethernet perspective, initial 1000Base-FL at $3,000 to $4,000 compares to an OC-12 (622M bit/sec) port at $4,000 to $5,000, which is like 1.6 times the performance at three-fourths the price.

**Why should users wait for gigabit Ethernet products rather than move to ATM today?**

I am sure that there are situations where one could justify the extra cost for using ATM backbone technology today as the only high-performance solution. But for the majority of users, even with high-performance requirements, 100Base-T switches and repeaters represent a much more cost-effective approach.

As 100Base-T has shown us, the technology is just too easy to use. No new network management training, no new protocols and no manual intervention in the case of link failure. ■

## MORE ONLINE

Speed over to Network World Fusion (http://www.nwfusion.com) for more info, including:

- A complete transcript of the Q&A
- A gigabit Ethernet primer
- A look at which vendors are doing what in the field

Select News then Local Networks.

NetworkWorld Fusion

# Storage vendors provide fast data access

**By Ben Heskett**

Symbios Logic, Inc. this week will announce two network-attached RAID storage systems that act as Network File System (NFS) file or backup servers.

The company's MetaStor servers use a combination of routing software and dedicated processors to guarantee fast access to files.

The first two models work in Unix networks, but the company plans to add support for Windows NT and NetWare LANs.

The base Model SH1000 includes 25.2G bytes of disk space, 32M bytes of both network communications and storage cache and a 10/100Base-T card. The base SH4000 model includes 84G bytes of disk space and 64M bytes of both network communication and storage cache and a quad-100Base-T card.

Separately, Storage Computer Corp. introduced the Storage SuperServer, which is aimed at providing mainframe-class storage on client/server networks.

The storage system can attach to multiple servers sharing storage. It includes 9G- to 23G-byte disk drives, an operating system that routes requests quickly and storage management software.

Storage SuperServer configurations range from 136G bytes to 4 terabytes. The product supports high-speed interfaces such as Ultra-SCSI and Fibre Channel.

✆Symbios Logic: (800) 862-7729; Storage Computer: (603) 880-3005.

**Storage stats**

| Product | Price | Availability |
|---|---|---|
| Symbios Logic's MetaStor servers | SH1000 starts at $49,375; SH4000 starts at $102,650 | June |
| Storage Computer's Storage SuperServer | Starts at $325,000 | June |

WIRED WINDOWS

# Why can't the Network Computer just go away?

Some ideas, no matter how bad they are, just won't die.

Oracle Corp.'s Larry Ellison and a chorus of munchkins tried once again last week to kick-start the market for Network Computers, also known as Internet appliances. Somehow, he roped in Apple Computer, Inc., IBM and Sun Microsystems, Inc. to launch the technical specification for the device.

Ellison, never one to be understated, said of the Network Computer: "It will change our economy. It will change our culture. It will change everything." What he's really hoping is that it will change Microsoft Corp.'s hold on the desktop.

The last person to come down with such a bad case of Microsoft Syndrome was Ray Noorda, who almost killed Novell, Inc. in his quest to dethrone Microsoft.

Remember that Ellison has described this wondrous machine as a computer with no disk drives, running a Web browser, connected to the 'Net and priced at $500 or less. He does concede that, at that price, you might also need a radio frequency converter to hook it to your TV rather than buy a monitor. A quick look at my morning newspaper shows I can buy a PC with 8M bytes of RAM and a 540M-byte drive for $549. Windows 95 adds $100, and I can add a Web browser for free. What possible benefit can the Internet appliance offer?

Ellison wants us to believe that this is the device that the home consumer wants.

Unfortunately, his sometime-partners at IBM are trying to convince us that it's really a business machine since that's where the nets are. But this product does not belong in a business environment. Any of you who've supported diskless workstations on your network know of the benefits of keeping storage local.

Dave Kearns

Meanwhile, Sega Enterprises, Ltd. has introduced the Sega Saturn Net Link. With a 28.8K bit/sec modem and customized Web browser, this plugs into the cartridge slot of a Sega game machine.

So the consumer electronics industry is delivering products while Ellison and friends are still trying to design a specification. They can't agree on the market for this vaporware, and, meanwhile, Windows 95 and NT are projected to take ever larger slices of the operating system pie.

SunRiver Corp., which participated in Ellison's announcement, summed it up best with its statement that it would build a Network Computer, but it would run Windows NT.

*Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@msn.com.*

## Tip of the week

*When multiple people use the same PC, it's sometimes annoying and possibly a security breach to bring up the previous user's name in the Windows 95 logon box. If you want to present the user with an empty logon box, try this: Bring up REGEDIT and find the key HKEY-LOCAL-MACHINE/Network/Logon/username. Change the value from a name to "" (i.e., an empty field). Now export the branch HKEY-LOCAL-MACHINE/Network/Logon to a file, such as logon.reg. Put this file in the root directory of C:. In AUTOEXEC.BAT, add the line "regedit c:/logon.reg." After booting Win95, you will be prompted with an empty username field.*

# Band-width is tight. ATM sounds nice. But it also sounds pretty darn expen-sive.

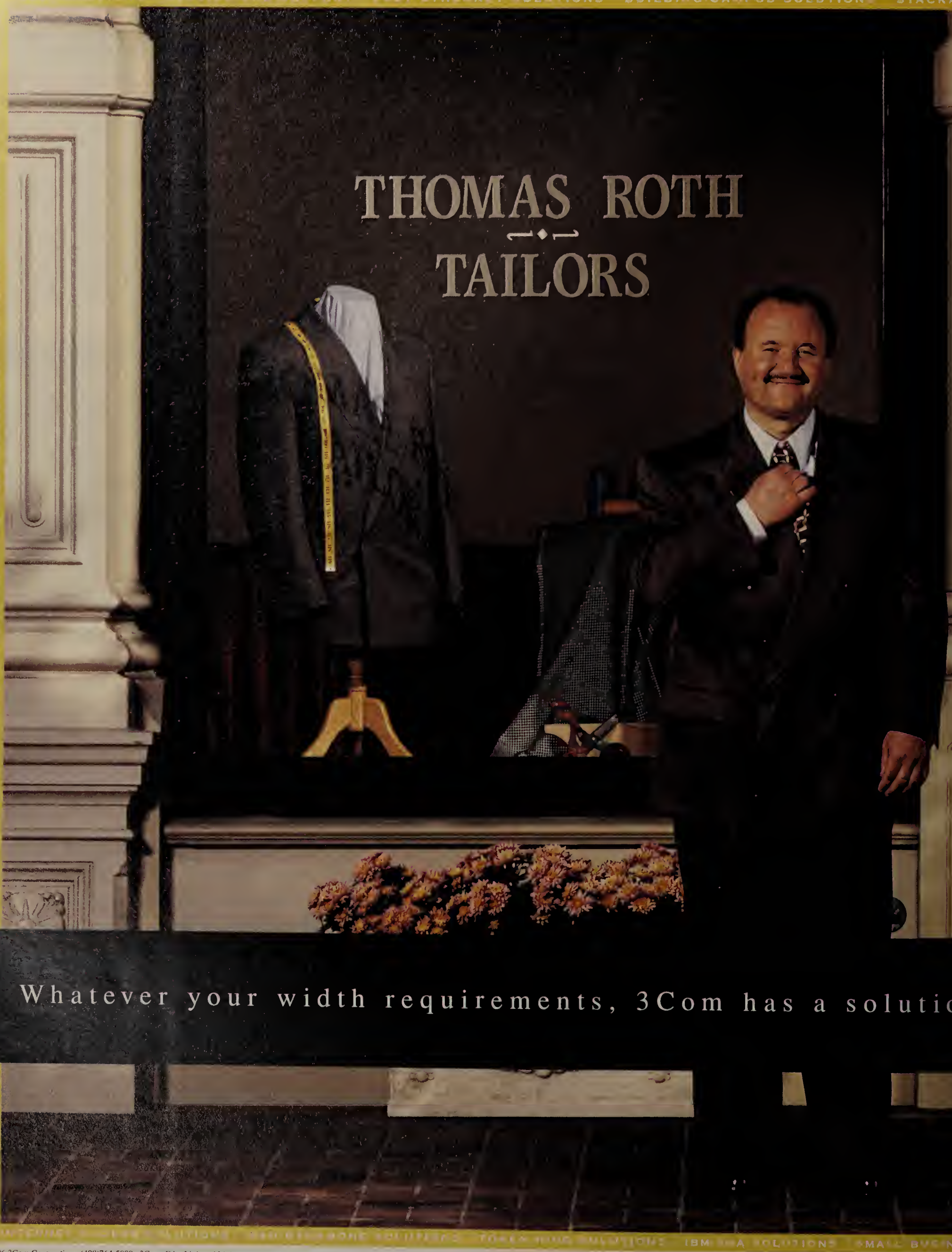
Switch IBM presents the first affordable 25Mbps ATM Workgroup Solution. Everyone is talking about ATM as the answer for speeding up busy networks. But there are two good reasons why business hasn't stampeded en masse to the ATM solution: It costs a lot. And to get there, you have to rip out everything you have.

Well, with all respect to the status quo, IBM now unveils the new 25Mbps ATM Workgroup Solution. It comes complete with workstation adapters, giving you an immediate boost in bandwidth, with plenty of room to grow in the future. And it all comes at the refreshingly low price of $495 per connection.

So why just dream about getting an affordable ATM solution when you can install one today? See your nearest IBM reseller or call us at 1 800 IBM-2468, ext. DA130, to learn more. Or, if you prefer, you can visit our Web site at www.raleigh.ibm.com/netad.html for all of the details. We have lots of information to share. And the good news is, we can get it to you fast.

IBM®

Solutions for a small planet™




Whatever your width requirements, 3Com has a solution

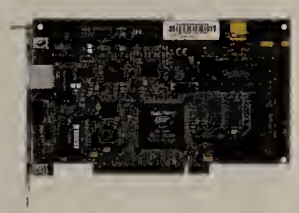

## Our Fast Ethernet & Switched Ethernet solutions are just the right fit for any workgroup.

Sophisticated desktop applications? Distributed databases? Multi-media applications? If you're uncertain about which bandwidth solution to apply to which situation, talk to us. Whether it's Switching, Fast Ethernet, or some combination of the two, we've got exactly what you need to outfit your workgroup. From NICs, to hubs, to switches, all of

*EtherLink® III PCI 10 Mbps NIC*

*SuperStack™ LinkSwitch™ 1000*

our solutions are flexible, cost-effective, and easy to implement. And all are tailored to increase performance now and into the future. To receive your free Scaling Workgroup Performance Kit, call **1-800-NET-3Com.**



*Fast EtherLink PCI 10/100 Mbps NIC*

*SuperStack LinkBuilder® FMS™ 100*

3Com®

TEST RESULTS

# Fast Ethernet? Not so fast

We spend a good deal of time reviewing requests for proposal, and lately we've been seeing a lot of plans to use Fast Ethernet as the primary backbone technology rather than FDDI or another technology specifically created for backbone implementations. This is of concern to us.

For the sake of our discussion, let's say the two most important issues for a backbone are sustained performance and fault tolerance. In one of the RFPs we have in front of us, a vendor claims that a shared — yes, that's right, shared — 100Base-T network can provide more than 90M bit/sec sustained utilization. Our question to the vendor is: Where? In Fantasyland? Downhill with a strong tailwind?

Fast Ethernet is based on standard carrier-sense multiple access with collision detection Ethernet, meaning that performance profiles for the two will be comparable. That means a shared Fast Ethernet network has a realistic sustained utilization limitation of 40%, or about 40M bit/sec. Fast Ethernet can burst traffic at 90% of bandwidth, but bursting and sustained traffic are two different things. We challenge any vendor to point us to a production-level 100Base-T network it has installed that's running at a sustained rate of 90%.

FDDI, on the other hand, uses a token-passing scheme that can handle high sustained rates of traffic — as high as 90% without a problem.

Another argument we've heard is that a point-to-point, full-duplex switched Fast Ethernet connection can provide a maximum throughput of 200M bit/sec. Let's dispel this ridiculous notion now. The 200M bit/sec bandwidth is potential bandwidth. At no point in a full-duplex Fast Ethernet connection does the user, server, network or application actually realize 200M bit/sec. At best, you get 80M bit/sec and bursts of high traffic.

It is also unclear whether full-duplex implementations make much performance difference in some applications such as centralized client/server, where many more packets typically go from server to client than from client to server. This type of application would benefit little from a full-duplex operation, considering the bulk of the traffic is transmitted in one direction.

**Skip MacAskill and Melinda Le Baron**

Now let's take a look at the fault-tolerant issue. What happens if you put Fast Ethernet in as your primary backbone technology and the network breaks? Absolutely nothing. No traffic moves. No applications get launched. No work gets done.

And what happens when your FDDI backbone breaks? Everything. With both a primary and secondary ring, FDDI has inherent fault tolerance. Fast Ethernet has nothing even close.

Of course, there is still the issue of price. There is no $200 network interface card for FDDI. Then again, there is no free lunch, either. One reason for the price difference between FDDI and Fast Ethernet is that Fast Ethernet does not have either the performance profile or the redundancy necessary for a backbone and, as a result, it needs less hardware. If we look at cost per megabit, Fast Ethernet works out to about $5 per megabit (in real bandwidth) and FDDI comes in at about $10 per megabit. When you increase the number of Fast Ethernet connections to provide the same redundancy of FDDI, both technologies cost about the same.

Users searching for a true backbone technology should look beyond the hype of switching and shiny new offerings to the real design requirements.

*Le Baron is a research director and MacAskill a senior research analyst in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached at inquiry@gartner.com or at (203) 316-1111.*

# PUT UP.

**Unique FRAME DESIGN**
*Engineered for unprecedented strength and stability, unit shown can safely hold 3,000 lbs. of equipment*

**Integrated CABLE MANAGEMENT**
*Conceals and organizes wires and cables for easy access*

**Total COMPONENT FLEXIBILITY**
*Over 500 interchangeable components*

# OR SHUT UP.

**LAN Locker II™**
*Configuration pictured has been engineered to hold up to 2 tons of equipment*

**Locking REAR DOORS**
*For easy access to hardware and cables*

**36" INTERIOR DEPTH**
*Plenty of room for your largest equipment*

**RACK MOUNT EQUIPMENT**
*Total integration of industry standard rackmountable hardware*

**CUSTOM CONFIGURATION**
*Choose components and their placement to suit your special requirements. And reconfigure them when needs change*

**PUT UP...** The open architecture of LMS II™ technical furniture optimizes vertical space, cleans up clutter and cables, looks professional and helps you work more effectively. And saving 50% to 70% space isn't hard to put up with either... just ask any of our over 30,000 satisfied customers.

**OR SHUT UP...** New LAN Locker II™ furniture architecture offers all the flexibility and configuration choices of LMS II in a completely modular, yet closed environment. Locking front and rear doors provide protection and security while offering full ventilation, equipment visibility, and easy access.

NEW EDITION READY NOW

**CALL or FAX today for your free full-color LMS Catalog and Ordering Guide.**

I have a need in
☐30 ☐60 ☐90 days.

Fax: 508 853-8904
Tel: 800 225-7348
http://www.wrightline.com

Name/Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Phone ( ) _____

NW

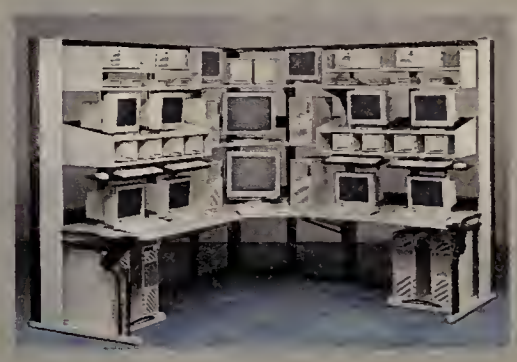
U.S. Patent
Des. 363,701

W R I G H T • L I N E
technical furniture solutions

See us at COMDEX, Booth #3406/3404

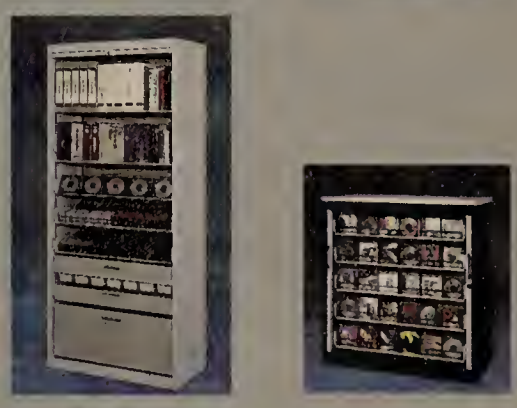
**NEW! TECH II™**
NEMA certified enclosures provide water and dust protection. Cooling options include up to 6,000 BTU air-conditioning. Locking doors keep hardware secure.

**NEW! LMS SWITCH™**
Controls up to 64 systems with one monitor, keyboard and mouse. You can assign system names – and locate them instantly.



**CORNER SPACE**
Put to good use! Wide range of configuration choices can be customized to suit every need.

**LMS II IN MANY SIZES**
From 24" to 96" wide, 42" to 84" high. Add Caster Base for mobility.



**LAN CABINETS**
Locking storage for LAN tapes, CDs and documentation. Over 50 interchangeable components for specific media.

*Circle Reader Service #2*

the internet is

Cool →

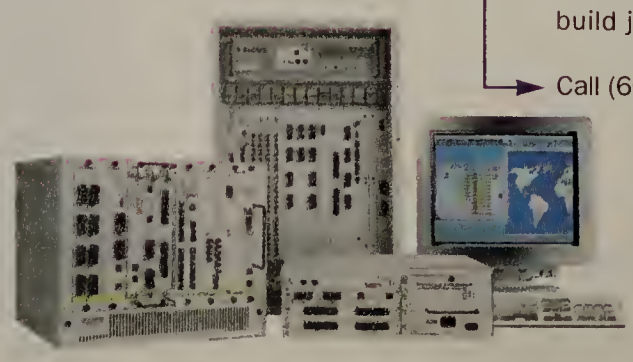

# the intranet is essential

So what's the difference you ask? How about greater productivity, better communication and lower costs for your business. Yes, the Internet provides unprecedented access to the world at large, but the Intranet customizes it to fit your organization.

Through simple point-and-click operation, your people have the freedom to call up voice, video, data, and any other resources they need to do a better job. Completely independent of network technologies, topologies and protocols, the Intranet ushers in a whole new era of communication, collaboration, and productivity among departments, workgroups, business partners, service providers and more....

But only if you have the right infrastructure in place. Enter Cabletron. Featuring high-speed switches; user-friendly management tools; the industry's only true virtual networking solution; and the world's largest service and support staff. Cabletron doesn't build just Intranets–we build a better way to do business. **Now that's cool.**

Call (603) 337-0912 to learn more about the essentials of the **intra**net and Cabletron Systems.



**Essentials include scalable, high-speed switches, an enterprise management platform and a true virtual networking solution.**

SYNTHESIS

The stuff **intra**nets are made of

CABLETRON SYSTEMS
The Complete Networking Solution™

**Corporate:** 35 Industrial Way, Rochester, NH 03867 • Fax:(603)337-2211 • Internet: http://www.cabletron.com/

*Circle Reader Service #**27***

# Client/Server Applications

**Covering:** Databases • Messaging • Groupware
Conferencing • Imaging • Multimedia • Development

## Briefs

■ **CenterLine Software, Inc.** *this week will announce QC/Advantage,* **testing software** *for client/server and intranet applications. The product lets users access any testing tool through one graphical user interface and capture test information from multiple tools. QC/Advantage's Test Foundation module lets developers model test suite structures graphically. Manual testing results may also be captured by the tool, and tests may be executed in parallel or batch mode across the network.*

*Available in 60 days on Windows clients and Unix servers, a five-user license, including training and consulting, costs $37,995.*

*CenterLine: (617) 498-3000.*

■ **Baranof Software, Inc.** *this week will ship ModemCheck 3.0, a new version of its software for managing modems on* **electronic mail** *networks that now includes remote monitoring capabilities. Version 3.0 also has enhanced reporting features and a revamped user interface. ModemCheck runs on Windows PCs or atop Simple Network Management Protocol-based management platforms. ModemCheck 3.0 costs $95 for the base system, which includes one modem license.*

*Baranof: (617) 926-6626.*

■ **Clarity Software, Inc.** *is shipping Compatibility Server 1.4, a* **file format translator** *for electronic mail and other applications that now supports HTML and Adobe Systems, Inc. Acrobat Portable Document Format. Version 1.4 lets users add, change and delete password-protected Address Book profiles, including home page URLs. Previously, this had to be done by mail administrators. Compatibility Server works with industry-standard E-mail, word processing systems and spreadsheets. The software runs on most Unix platforms and requires a Unix-based Simple Mail Transport Protocol hub. Pricing is $10,000 per server.*

*Clarity: (415) 691-0320.*

# Smalltalk vendors bitten by 'Net bug

*GemStone, ParcPlace-Digitalk feel the Java heat and update product lines.*

**By John Cox**

There is less talk about Smalltalk these days, even from companies that sell products based on the object-oriented language.

Rather, Smalltalk vendors are talking up a component software approach that relies heavily on Internet technologies. Increasingly stiff competition from Java for object-oriented development dollars is forcing Smalltalk vendors to change their ways, said Don DePalma, an analyst at Forrester Research, Inc. in Cambridge, Mass.

"The differences [between Smalltalk and Java] are pronounced enough that you really can't afford to build components in different technologies and ensure they're all bullet-proof to roll out to your users," he said.

GemStone Systems, Inc. this week will unveil Release 5.0 of its GemStone repository for Smalltalk objects. It will also introduce GemConnect, to link GemStone applications with relational databases; GemBuilder, to let third-party Smalltalk tool sets work with the repository; and GemAdmin, a tool for managing GemStone applications. Release 5.0 uses less memory but supports 50% more users and 100% bigger databases (up to 100G bytes) than the previous version.

Separately, ParcPlace-Digitalk, Inc. has released its plan for a unified Smalltalk product line, about a year after ParcPlace and Digitalk merged. The Jigsaw line will be a multilanguage tool set for building object-oriented client/server applications that can run over the Internet, said Martin Yam, ParcPlace-Digitalk vice president of marketing and Internet services.

Jigsaw's base image — the total collection of object classes required to build and run a Smalltalk application — will be much smaller and more flexible than the existing image.

ParcPlace-Digitalk is also readying new tools, including PARTS for Java, a graphical tool set for creating and linking Java objects. Jigsaw begins beta-testing in August, with release planned for early 1997.

**Cut through the chatter. Connect to Network World Fusion (http://www.nwfusion.com) for links to a variety of Smalltalk resources.**

NetworkWorld Fusion

GemStone and ParcPlace-Digitalk earlier this month announced a jointly developed offering called Internet Application Server, which combines the GemStone repository with the VisualWave Application Server and tool set. The intent is to create a scalable server that links Web browsers with transaction-oriented applications. The server is available now as two separately priced products. The total price starts around $13,000.

✆GemStone: (503) 629-8383; ParcPlace-Digitalk: (408) 481-9090.

# Sybase to put past behind it

Q&A

Sybase, Inc. has just emerged from an unprofitable quarter, posting a net loss of $6.9 million. Meanwhile, competition is fierce from Informix Software, Inc., Microsoft Corp. and Oracle Corp. Recently, IDG News Service Paris Bureau Chief Marc Ferranti, along with *Le Monde Informatique* reporters Philippe Davy and Philippe Rose, met with Sybase Chief Executive Officer Mark Hoffman to get an update on Sybase and its challenges.

Sybase's *Hoffman*

**Was last quarter's loss a result of a weak market or specific Sybase problems?**

The market's fine. There are a lot of areas that look good — data warehousing, very small footprint databases, PDAs, remote devices . . . and the gross [margin] in [some of these areas] is huge or can be. We had reorganized our sales force and field organization on January 1, and what happened is they were just disrupted for a couple of weeks.

**Are there also technical reasons for the loss? System 10 didn't sell so well and the other databases are catching up.**

System 10 was the issue last year. System 11 came out toward the end of December; it fixed all the issues, all the problems we had.

**Do you intend to enter the Web server market?**

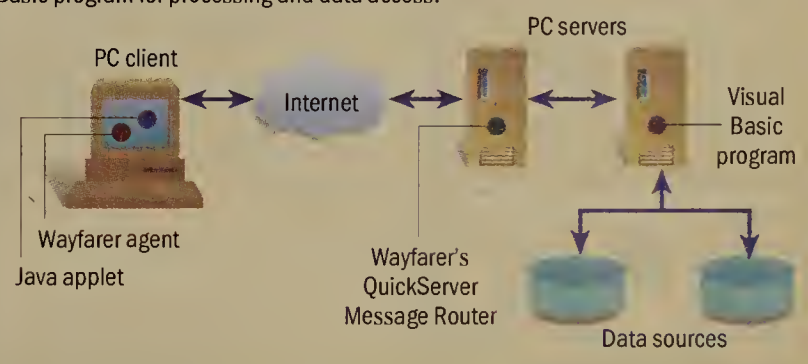
We are a major player in Web servers. We've got two of them: We have SQL Server, which is Web-enabled, and SQL Anywhere, which is a small-footprint database. It's very important to allow a Web page to become a dynamic page. Otherwise, you have a static page; you have to close the page and reopen it. With web.sql [which connects with System 11], it happens dynamically.

**There seems to be a trend, following Microsoft BackOffice, to do packages of tools. Oracle came up with InterOffice. Do you have anything along these lines in the works?**

We could actually combine our products, particularly now that we have Visual Components [a component software company acquired last year]. We could do a very nice office suite, particularly [one] that's a leading-edge Internet suite. ■

**Wayfarer blendsJava with client/server**

Wayfarer simplifies Java access to existing client/server systems, eliminating the need for manual coding. The Wayfarer agent is incorporated into Java applets, creating a fast link to the QuickServer Message Router. The router passes the Java request to a Visual Basic program for processing and data access.




# Vendors add depth to Java tools market

**By John Cox**

Two development tools vendors this week will announce very different approaches for supporting the Java programming language.

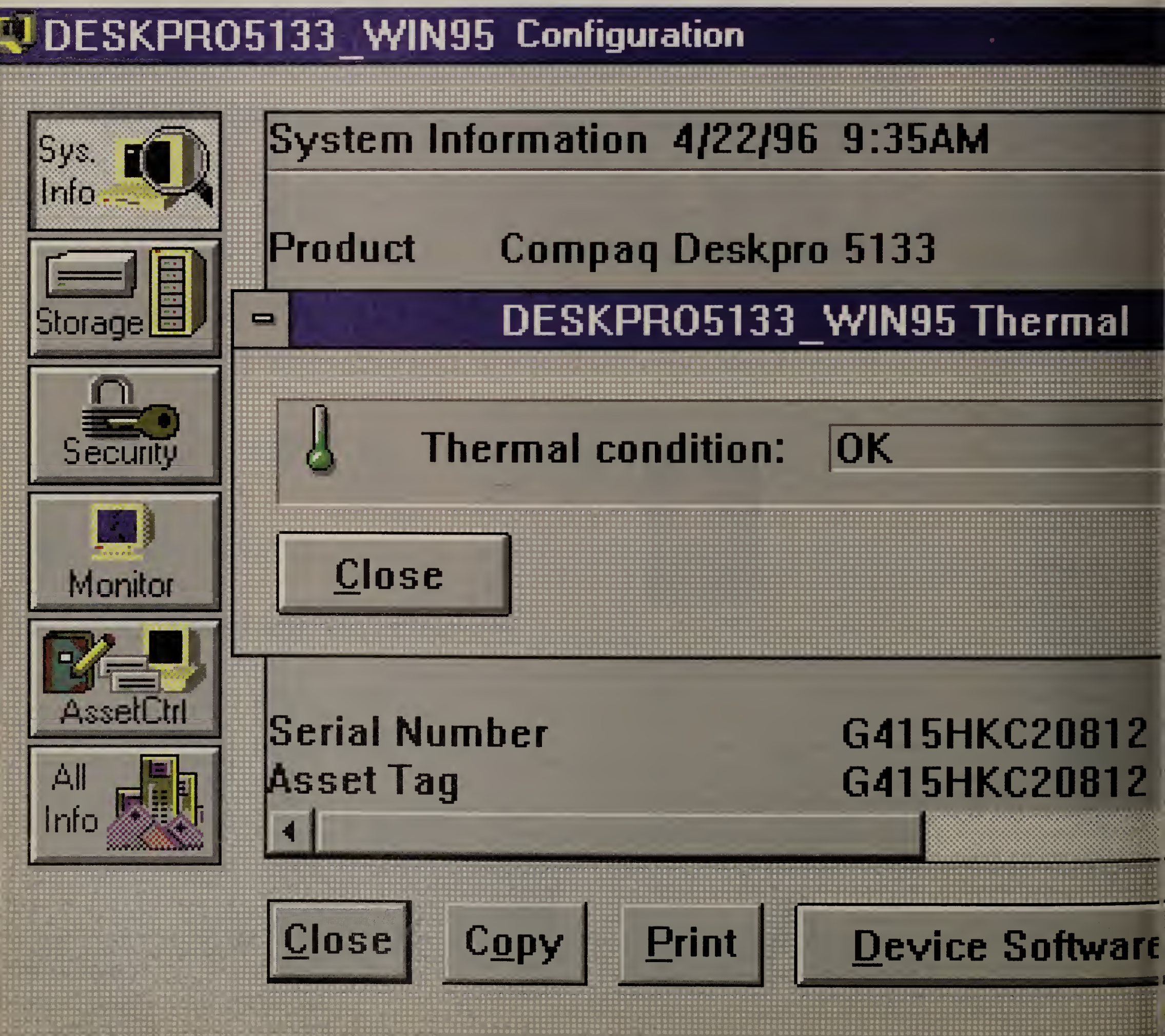
Wayfarer Communications, Inc. is extending its messaging middleware tools so Java applets can be linked easily with existing Microsoft Corp.-based client/server systems. Separately, Visix Software, Inc. is creating a portable software development environment that will support lean and mean Java applets that can access a host of distributed object services.

Wayfarer has released agent software that makes it easier to build Java applets that can make use of back-end databases. The agent code, once injected into a Java applet by a developer, passes along data requests to Wayfarer's QuickServer message router via the Internet or an intranet connection. QuickServer then forwards the request to the appropriate server agents — initially, Visual Basic programs — for processing and database access.

The new agent, called QuickServer for Java, is now part of

*See* **Java,** *page 38*

A Lot Of Computers Claim To Be The Best. This One Sends You Its Health Records To Prove It.



The biggest headaches always seem to come without warning. Well, that's no longer the case when it comes to managing the desktops on your network. Thanks to Intelligent Manageability, found only on the Compaq Deskpro, we've revolutionized the way you manage and support your desktops on a complex network. The Compaq Deskpro constantly keeps you informed of its vital signs. So before something goes wrong, you know about it. And even better, you're prepared.

*The Compaq Deskpro.*
*With Intelligent Manageability, we've revolutionized the way you manage and support your desktops on a network. It raises your control to an unprecedented level.*

By taking full advantage of the broadest range of management tools, we've redefined the meaning of control. And knowledge. Now, status reports are retrievable right from the desk of the administrator, allowing you to manage your entire PC inventory from a single location. And our commitment to open standards has driven us to develop the widest range of industry partners, making Intelligent Manageability easy to integrate into any network.

More importantly, you'll be alerted to potential problems—before they become real problems. Hard drive failure is no longer life-threatening. Quite literally, the Deskpro monitors its internal temperature while the IntelliSafe hard drive conducts its own diagnostics, forewarning you of potential failure. And as a preventative measure, critical data is automatically safeguarded on a backup tape. All this gives you ample time to replace parts at no expense under our Pre-Failure Warranty.* We've even got a range of features that protect your data and components—just in case anyone without authorization tries to get hold of them.

Easy to inventory. Easy to maintain. Easy to protect. Intelligent Manageability offers the best desktop management solution in the industry and raises your control to an unprecedented level. The Compaq Deskpro. After all, it's a computer that constantly checks its own pulse.

COMPAQ

Has It Changed Your Life Yet?

intel inside
pentium® PROCESSOR

SHARED LOGIC

# Putting workflow to work for you

Workflow may be the secret weapon that separates successful companies from unsuccessful ones.

The good news is that modern electronic messaging systems are bringing simple workflow to the masses. The bad news is that setting up complex production workflow remains as difficult to orchestrate as ever.

Daniel Blum

There are three kinds of workflow management systems. At the most basic level, you can tease out the workflow capabilities already in your existing applications, such as Microsoft Corp.'s Office.

From there, you can graduate to mail-enabled electronic forms routing software, which is available with electronic mail packages.

The third and most difficult species of workflow is called production workflow. You know you've been stuck with one of these projects when the case you've been asked to automate deals with a complex folder of objects, including components such as documents, company databases and scanned images.

To craft a successful white-collar assembly line based on production workflow, you will have to negotiate a series of pitfalls. First, redesigning business processes is an intensely political process. Second, you'll find that even if you can get the affected groups to work together, they may be using different workflow process design tools with various user interfaces and models. Finally, as James Kobielus, a product planner at LCC, L.L.C. warns: "The end user must not be made to feel that your workflow project is some ominous form of social engineering."

You'll need to manage people, expectations and technology to succeed. To make sure you're not on a fishing expedition, construct a business case detailing success factors, such as the ability to perform the production workflow process using fewer people, reducing time and improving accuracy. You'll also need to make sure your team includes at least one good business analyst and at least one technical guru versed in the appropriate tools, forms and macros.

Will it ever get any easier? Maybe. Microsoft and the Workflow Management Coalition are adding Workflow Extensions to Microsoft's Messaging Application Programming Interface that will enable users to access complex rules-based workflow servers with simple front-end tools. For those who believe that most production workflow projects fail because the tools can't be tied to the business process, Hewlett-Packard Co. is devising a workflow middleware system called Process Manager that is capable of linking various process design tools to E-mail and Web infrastructures, as well as client/server and legacy applications.

While production workflow may still be out of your reach, don't fear grabbing for some low-hanging fruit. With today's mail-enabled applications, universal in-boxes, integrated forms and document management systems, almost anyone can do ad hoc workflow.

*Blum is a principal at Rapport Communication, a consultancy that focuses on messaging, groupware and electronic commerce. He can be reached at dblum@interramp.com.*

## Java

*Continued from page 35*

Wayfarer's QuickServer Software Development Kit, priced at $995. An evaluation version of the software developers' kit is available free via the World-Wide Web (http://wayfarer.com).

Visix of Reston, Va., this week will demonstrate a Java development tool set dubbed Eleven at the JavaOne conference in San Francisco.

The tool set has two parts. One is a complete visual development environment, including compiler, debugger, editors and team development capabilities, among other features.

The second part is the deployment foundation, called the Intranet Application Platform. IAP supplies each Java application with a wide range of functions and services through a common set of shared class libraries. These run on a range of operating systems. The IAP also creates a peer-to-peer object model that, by year-end, will let Java applets interact over the network.

Release 1.0 of Eleven will be available in December. The development environment is expected to be priced under $3,000. Pricing for the IAP has not been set.

✆Visix: (800) 832-8668; Wayfarer: (415) 903-1720.

## Briefs

■ **Digital Style Corp.** *of San Diego this week will announce an enhanced version of its WebSuite line of graphics tools for Web page developers. WebSuite 1.1 features a new user interface that automatically launches tools commonly used by* **Web page creators,** *component catalog automation, new style groups to enable users to match text fonts, and special effects and upgraded graphic editing options that allow developers to exert more control over shape, color and font selection.*

*WebSuite 1.1 will be available June 5. Pricing for the WebSuite Standard Edition, which originally sold for $299, has been slashed to $99.*

*Digital Style: (800) 388-7895.*

■ **Macromedia, Inc.** *of San Francisco this week will release new versions of* **Shockwave,** *its plug-in software for adding multimedia interactivity to Web pages. The versions are for Macromedia's Director 5.0 authoring tool, FreeHand 5.5 graphics program application and Authorware 3.5 interactive referencing tool.*

*Shockwave can be downloaded free from Macromedia's Web site (http://www.macromedia.com) beginning May 31.*

*Macromedia: (415) 252-2000.*

**According to a report by The Maloff Co., a Dexter, Mich., consultancy, the top 10 Internet service providers in terms of total IP access-generated revenues in the U.S. today are:**

| | |
|---|---|
| MCI | $97.0 million |
| UUNET | $96.5 million |
| Netcom | $96.4 million |
| AT&T | $90.7 million |
| PSINet | $68.4 million |
| Sprint | $28.3 million |
| Supernet | $25.5 million |
| BBN | $20.6 million |
| ANS | $14.0 million |
| CERFnet | $11.0 million |

**The U.S. market for IP access services hit $720 million in April and is predicted to reach $2.5 billion by next spring.**

# UUNET AlterDial users are now free to roam

**By Joanie Wexler**
*Fairfax, Va.*

UUNET Technologies, Inc. last week launched a global Internet service that could save mobile customers cash and ease the process of connecting.

The Internet service provider (ISP) announced a roaming service for its U.S.-based users. Starting May 31, laptop-toting users can dial a local number in 92 foreign cities and access the UUNET backbone just as they would in the U.S., said Alan Taffel, vice president of sales and marketing.

A surcharge of $6 gets added to their regular monthly bills, he said. Users will be provided with a directory of local dial access numbers in those foreign cities.

The initial nine countries with local UUNET access include many European nations, Canada, Japan and Australia. UUNET plans to bring up another eight countries in Europe and Asia in late June (see graphic).

The point is to provide 'Net services that work the same way everywhere. Before now, traveling users had to place pricey international phone calls to the U.S. to reach the UUNET backbone or set up dial accounts with local providers in the countries they visited.

"When things operate differently, it drives you out of your mind," said Pim Goodbody, vice president of management services for the Securities Industry Association in New York. The trade association has a deal with UUNET to offer discounted 'Net access services to its investment company members. "I would think this would encourage users to use the 'Net more extensively," Goodbody said.

The roaming service says reams about UUNET's strategy, which Taffel described as "building a fiber ring around the globe" to better control service quality.

It is a strategy that hits home with users. "Multinationals are better off dealing with one carrier in terms of reliability, security, price and billing," said Ameet Patel, manager of technology development at BASF Corp. in Mount Olive, N.J.

UUNET's international aspirations were the biggest factor behind its recent merger with global phone company MFS Communications Co., Inc. (*NW,* May 6, page 1). Before the merger, UUNET was on its own acquisition binge, picking up last October Cambridge, England-based Unipalm Pipex, the largest ISP in Europe. In November it gained a 40% interest in EUnet Germany, and last month upped its interest in UUNET Canada to 51%.

These relationships have allowed UUNET to upgrade those networks to its access platform of choice from Ascend Communications, Inc. and thus offer consistent services.

UUNET competitors aren't far behind: BBN Planet has a deal with global carrier Scitor that will soon allow users in other countries to make local calls to Scitor to access the BBN U.S. backbone. And PSINet, Inc. recently acquired ISP EUnet UK. ■

**JUST LIKE HOME**

**UUNET users who roam from the U.S. will get local dial access in 17 other countries this summer, with usage added to their regular bills.**


# How to keep someone from hiding in plain view

**By Winn Schwartau**

The military wanted the perfect weapon — an invisible one. Voila. Along came the Stealth aircraft, which can dodge radar.

Criminals wanted to be invisible perpetrators when carrying out their deeds. Voila. Along came the Internet, which lets them assume anonymous identities and cover their tracks.

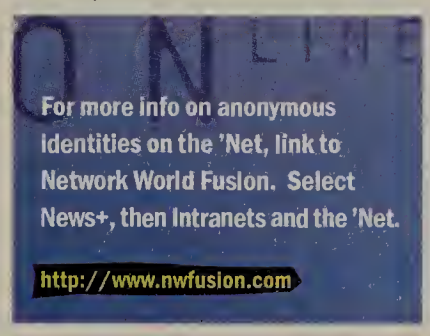
Yes, the modern wired organization faces two problems when it comes to network anonymity.

You have to deal with anonymous intruders knocking at your electronic front door. Then, you need to concern yourself with employees who want to anonymously navigate the netherworld of the Internet.

But initially, you will need to know how people make themselves invisible on the Internet. One of the most popular ways is to use an anonymous remailer such as penet.fi in Finland.

By sending electronic mail to info@penet.fi, you can acquire a numerical identity that has no relation or connection to your real identity. Ostensibly meant to promote free speech in countries where you can be persecuted for saying what's on your mind, penet.fi can also be a haven for illicit behavior. Likewise, an employee who adapts a penet.fi identity can bypass corporate Internet policies and receive mail from sights that might be otherwise blocked.

To combat this threat, some companies block any and all access to penet.fi, deny mail from it and, if smarter firewalls are employed, siphon off any traffic to it — or any suspicious information for that matter — for a hands-on content inspection. But anonymous remailers are popping up all over.




A new company, Offshore Information Services, Ltd. (http://online.offshore.com.ail) in the Caribbean tax haven of Anguilla, offers privacy services over the Internet. The company says it is offering its services as a result of recent efforts to censor the Internet in France, Germany, China and the U.S. For a fee, users can adapt a new electronic identity for E-mail, cryptographic privacy and Web sites.

Of course, hackers also take advantage of the myriad holes around the Internet. "All you have to do is walk into any university computer lab, log on as guest — they have no concept of physical security — and off you go," says one well known hacker who — you guessed it — asked for anonymity.

"Most sites have amazingly poor audit trails, and if you can't see who's coming at you, there's no way you can catch him."

**Plan of action**

This suggests that you should consider splitting your electronic doors to the Internet into several discreet firewall-protected entryways.

One door might be for all incoming Internet traffic where outsiders are encouraged to come in, browse, buy or, perhaps (with proper credentials) be permitted to enter the inner sanctums of your network. In this case, security is the paramount concern and you should acquire the best firewall/Internet access control device money can buy.

It is your decision, then, to permit or deny access to people without real identities.

Another door might be the one that permits authorized rov-

*See* 'Net, *page 40*

## 'Net

*Continued from page 39*

ing salespeople or even customers to directly access internal network resources over an Internet connection. A stronger means of user identification is in order here — certainly stronger than a password — such as a token-based device like Security Dynamics Technologies, Inc.'s SecurID and Secure Computing Corp.'s LOCKout.

You should think about physically separating your inviting Web sites from your internal network connectivity. While many companies place their Web server software on the same workstation that runs their firewall in a cost-savings attempt to combine functions on a single logical server, security risks abound. What good reason is there to tie your billboard to your bank statements?

Once Web server and firewall software have been separated, the playful hacker can, if certain security holes are overlooked, still gain entry to your Web server, paint a mustache on your chief executive officer and, in reality, still not cause any real damage.

Just ask United Artists Pictures, Inc., which suffered similar indignities. The ill-fated movie *Hackers* was so poor it literally begged for the onslaught of electronic graffiti it received. Real hackers penetrated the film's Web site, added electronic graffiti and changed the rave reviews to miserable pans. The movie company took advantage of the situation and turned it into a public relations event.

Anonymity can take other forms on the 'Net, as well. Hackers often break into sites using telnet and then move forward in their trek through cyberspace. To the victim site, it looks as if the intruder came from the telnet site, not the hacker's original location. From your site, all you see is the last telnet location, and the hacker has virtual anonymity with a newly adapted electronic identity.

So, from an administrative standpoint, you have a decision to make: Do you block certain sites or types of sites, such as all people with an address ending in .edu, or do you enforce a stronger user-identification and authentication mechanism?

### Remotely anonymous

Dial-up ports into organizations present similar opportunities to the bad guys. Once your password protected dial-up site is hacked and your Internet server is accessed, any behavior carried on thereafter could be traced back to you. That is because subsequent hacker activities might be carrying your company's domain name and electronic address.

And what about pesky employees? Do you allow them to adapt an anonymous identity from your site, or is that a no-no? In either case, what can you do?

You need a smart, strong firewall that will scan the header of all outgoing messages. Do they contain an expected and legitimate address, or some other return address that might indicate less than honorable intentions?

Content and outgoing header filtering is key to this protection. After all, you don't want to find yourself or your company known as Porn Central because an anonymous user has successfully set up a Dirty Picture Server. Just ask Lawrence Livermore National Laboratory in Livermore, Calif. They lived and breathed it. One industrious researcher type posted over 30,000 blushingly obscene pictures on the company's computers until he was finally put out of business.

Should your corporate policy restrict access to known anonymous remailers, or is a bit of nonbusiness-oriented restriction in order? Should your E-mail come from known good sites while you refuse mail from questionable sources?

Either way, you do have the ability to limit your exposure from external anonymous threats and from internal users adapting a faux persona from your site. You can make your own choices. But you should know, or at least be able to identify, the person behind the header. Remember, it is far better to know your enemy than to not know one who claims to be your friend.

*Schwartau is president of Inter.Pact, Inc., a consulting firm specializing in information security and electronic privacy, and editor of "Security Insider Report," a monthly newsletter. He can be reached at winn@infowar.com or (813) 393-6600.*

## NETWORK HELP DESK

Network World *tracks down answers to your questions. Please submit them to Chris Nerney via phone at (800) 622-1108, Ext. 451, the Internet at cnerney@nww.com or fax at (508) 820-1103.*

**My server has been occasionally giving this message: "Primary interrupt controller detected a lost hardware interrupt." What does this mean, and where do I start looking to find the "lost" interrupt?**

**Via Network World Fusion**

This message tells you that some device — a hard disk controller, for example — generated an interrupt service request (ISR), says Ron Nutter, a Certified Novell Engineer in Lexington, Ky. When the processor saw that an ISR had been generated, it looked for what device needed servicing. However, the processor did not receive acknowledgment of its query.

If the message only appears once in a while, you probably don't have much to worry about, Nutter says. But if the message appears frequently or several times in succession during a short period of time, you have a potentially serious hardware problem.

Look for what devices, such as network interface cards or parallel ports on the server, are active when the message occurs, Nutter suggests. By tracking device activity, you should be able to pinpoint and replace the problem hardware. You'd also be wise to make sure you have the latest versions of the drivers for the hard disk controller and the LAN cards in the server, he recommends.

You can disable the message by typing "set display lost interrupt alerts = off" at the server console and by entering this same line in the server's start-up.ncf file before the line that loads the hard disk controller driver, Nutter says.

**Be helpful**

While you're in the Help Desk conference, come to the aid of your peers.

A user is having trouble with implementing some of the more sophisticated features, such as user and system policies, of Microsoft Corp.'s Windows 95 operating system on a Banyan Systems, Inc. VINES network.

If you have any suggestions, go to Topic 49 and lend a hand.

# Up remote LAN performance: Cache application data locally

*Storing data on a remote client's hard drive can improve application response time.*

**By Gary Krall**

Remote access solutions that actually provide adequate performance have finally become a reality since the realization that high latency is just as much to blame for inadequate performance as lack of bandwidth.

Popular applications such as electronic mail programs, databases and productivity tools are written under the assumption that they can communicate with the underlying file system at LAN speeds. Accessing such applications with a slower dial-up connection results in delayed response times, leaving much to be desired with respect to performance.

### More bandwidth, less data

The blame for inadequate remote access performance has been placed largely on the lack of bandwidth. That's not such an easy problem to solve.

It is expensive to add bandwidth, and the extra capacity usually provides lackluster results and poor returns on investment.

To circumvent such unsatisfactory options, data compression has been coupled with increased bandwidth. Data compression is a technique that moves more data through the circuit than the signaling system would otherwise allow.

By transforming a set of data into a smaller representation of that data, space and transmission time can be saved. Squeezing more data over a circuit allows compression protocols to increase throughput considerably.

However, compression has its limitations. Not only does compressing on demand require a substantial amount of processing power, but data compression techniques typically become impractical at speeds higher than T-1. Compression does increase remote access performance, but not nearly to the level of working directly on the LAN.

While focusing on ways to load the dial-up connection with more and more compressed data, developers have overlooked a significant problem: latency, or the round-trip time associated with sending a single byte that must traverse routers, gateways and firewalls each time an application places a file system call.

Applications that generate redundant file system calls are best suited for use directly on the LAN, where the data sent between the application and the file server can take place at LAN speeds transparently. Using these applications on a slower dial-up link presents a serious challenge because latency creates significant delays.

Compression is not equipped to address the latency issue. The only way to solve the latency problem is to not send the data at all. This is where caching comes into play.

### Cashing in on the cache

A cache is high-speed memory for holding to-be and recently accessed data. By caching such data, application requests can be processed locally rather than over the network. Caching is available primarily through software that can be loaded directly on a remote user's PC and on the target file server.

In order to cache data in a remote access situation, network managers must take two design variables into consideration: the amount of data to be cached at one time and the length of time that the cache will keep the data before accessing the file server and refreshing it.

It is important to note that caching is a useful tool only as long as the data accessed from the cache is guaranteed to match the file server data. Even the most frustrated of remote access users would not trade faster access speeds for stale data.

The cache can be designed to remember either whole files or blocks. With whole files, coherency between the cache and the server can be maintained, but the impact on performance in terms of applications response refreshing or updating is very high.

Caching blocks instead of whole files results in significantly better performance, though maintaining coherency then poses a challenge to software developers.

It is also possible to direct the cache to update its memory at different times. The most logical and effective choice is to direct the cache to update itself each time the data on the file server changes, which invariably creates the need for a checking mechanism that must constantly be at work to validate that the data being held in the cache is identical to the data on the file server.

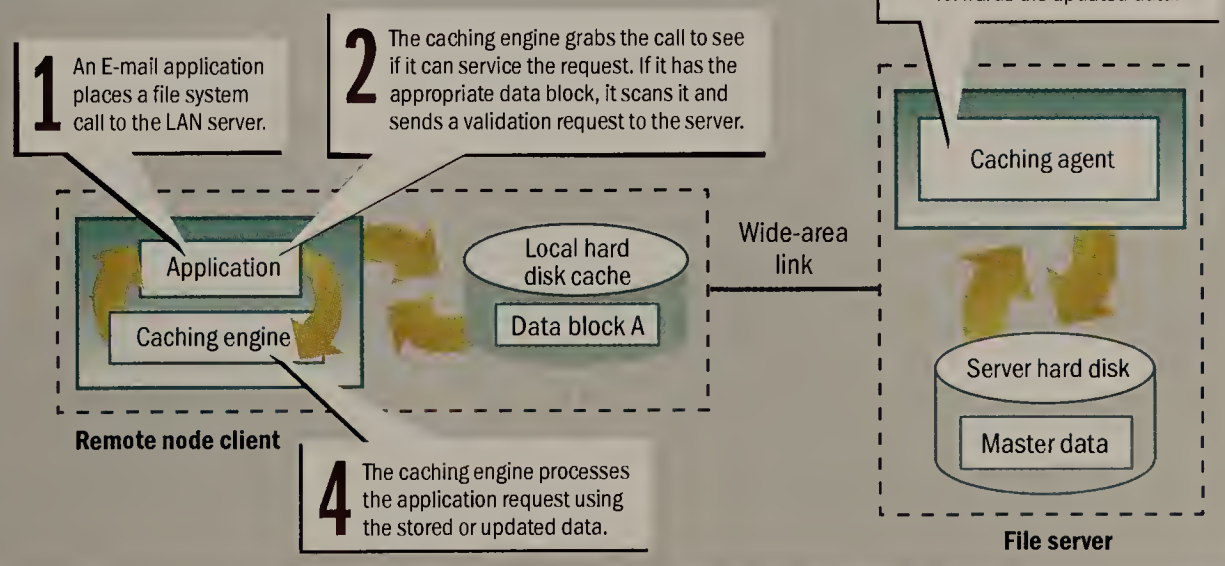
By creating a permanent cache on the remote user's local hard drive and using it to store frequently accessed data the user would ordinarily access remotely on the file server, the size of remote transmission is significantly reduced and latency is effectively controlled. In reducing the time spent traversing the network, caching becomes the ultimate counterpart to any existing data compression scheme.

*Krall is vice president of marketing at AirSoft, Inc., a provider of caching software in Cupertino, Calif. The company can be reached by phone at (800) 708-4247 or on the Web at http://www.airsoft.com.*

## HOW IT WORKS

### Using a local cache

By storing frequently accessed data in a local hard drive cache, users can cut the long response times they experience when running LAN applications remotely.




## Need information?

Let *Network World* provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Beth Schultz by phone at (312) 283-0213 or via the Internet at bschultz@nww.com.

# Would you bet on it?

Certain tasks are best left to the people who do them best. Which is precisely why, when it comes to network adapter cards, it makes sense to look to the industry leader: 3Com.® Whether it's NICs, hubs, routers, switches, or network management, 3Com is committed to understanding how networks work best. As a result, when you install a Fast EtherLink® or EtherLink III card, you can take advantage of ongoing software enhancements that deliver benefits such as guaranteed multi-media support and improved network management. So for the right network cards, look to the company that has made over 30 million network connections. We're as close as you can get to a sure thing. To evaluate our adapters at reduced prices call **1-800-NET-3Com.**

Get PicureTel's® Live Share™ Plus data conferencing software free.*

*Fast EtherLink and EtherLink III Network Adapter Cards*

3Com®

EDITORIAL INSIGHTS

# *E-mail counts at the FCC*

A milestone was reached earlier this month when the Federal Communications Commission for the first time accepted E-mail comments into the official record of a specific proceeding. The occasion was the FCC's call for response to a controversial petition by a group of long-distance carriers to regulate phone calls over the Internet.

This heartening event holds out the promise for better-informed government policymaking. But there was both a positive and a negative side to the torrent of E-mail that flowed into the agency.

On the plus side, the comments offered a perspective the lobbyist-besieged commissioners never hear. Many respondents said an Internet alternative to circuit-switched long distance is needed simply because telephone bills keep going higher. That's a different story than the FCC hears from the big corporate interests, which always assert that prices are really falling.

On the downside, few of the E-mail responses really addressed the issues raised by the petition. The carriers went too far in calling for a ban on telephony software, but they did raise compelling issues over who should pay for the nation's telecommunications infrastructure. And some of the respondents completely misunderstood the proceeding, assuming the FCC was proposing to ban Internet telephony.

"I am alarmed by the willingness of the FCC to strangle one of the newest industries on the Internet," one respondent wrote. Said another: "Do not stop the use of the Internet for voice. What should be stopped is the FCC." A third wanted to know "how much of a kickback the American government will get to ban the Internet phones."

Keep in mind some basics if you decide to join the E-mail parade at the FCC:

- Read the FCC request for comment carefully. It almost always lays out specific questions.
- Don't express skepticism (as many did this time) that FCC officials will read your missive. They have to — it's the law.
- Remember all the usual cautions about E-mail being essentially public. In fact, those cautions go double. Once you comment to the FCC, it becomes part of the public record and anyone can read it. After all, how do you think I got to read all this mail?

*David Rodhe, senior Washington correspondent* drohde@nww.com

## Teletoons

*By Phil Frank and Joe Troise*
*baba@sfgate.com*


TOLLY ON TECHNOLOGY

# Recent reports of ATM's death are greatly exaggerated

ATM, RIP. No, I'm not serious — it's not time to begin writing ATM's epitaph. But given the ferocity of the now-fashionable backlash against ATM, the thought has crossed the mind of an analyst or two. The mixed signals sent out to attendees of the recent ATM Year 96 conference didn't help matters (*NW*, May 13, page 1).

Kevin Tolly

The charmed life Asynchronous Transfer Mode led when it was pure vapor has, paradoxically, turned terrible just as industry-standard products are at long last hitting the streets. It seems that each week, another pundit is declaring ATM unfit for yet another of its heretofore anointed roles.

The upshot is that bewildered end users who had learned that ATM was synonymous with strategic are reeling. If the E-mail I've been getting is any indication, network managers are nearly paralyzed by the current fluctuations in the ATM futures market. They just don't know what to think when it comes to an ATM strategy. ATM's inherent complexity doesn't help.

*The charmed life ATM led when it was pure vapor has, paradoxically, turned terrible just as industry-standard products are at long last hitting the streets.*

So is ATM still a viable technology on which future network infrastructures should be based? The answer is a resounding yes, for two basic reasons.

First and foremost, ATM has long-term technical advantages that competing technologies can't match. Vendors and the trade press have spent the past several years extolling these virtues, so I won't repeat the litany here.

While devices such as LAN switches have stolen some of ATM's thunder recently, let's not forget about the long term. The standard, cell-based transport of data allows data flow natively, without conversion or repackaging, from desktop to campus to WAN and back again. While such deployment may be years away, the potential is there. Today's LAN/WAN solutions require packets to be split, combined or otherwise repackaged as they enter the WAN. This approach will always prove problematic.

ATM's other attributes, such as built-in support for quality of service, provide a basis for powerful applications down the road.

The second and more powerful reason why ATM won't die any time soon is money. The years of good press for ATM succeeded in setting in motion the most concerted technical effort most of us have ever witnessed.

Investment in ATM research and development has been massive. Furthermore, it has not been confined to companies already successful in traditional LAN/WAN internetworking. From giants such as Fujitsu Business Communications Systems to start-ups such as Scorpio Communications, dozens of companies are joining the ATM fray, along with hundreds of established networking companies.

Even at this early stage, the ATM market is already crowded. With so much invested, these vendors simply won't allow ATM to languish or, heaven forbid, fail.

Ironically, the three vendors most able to shape opinion in the realm of networking and, presumably, turn up the heat under ATM deployment — Cisco, Bay and 3Com — might actually welcome the current ATM paralysis.

A rapid migration to ATM has the potential to destroy the hegemony the Big Three currently possess. In a world without ATM, Adaptec, Fujitsu and many other vendors would not even be players. The longer the Big Three can hold ATM in abeyance, the longer they can hold and fortify their position of leadership.

In the meantime, the Big Three just happen to be the major purveyors of the "interim" solution: LAN switching. By selling LAN switching products, vendors can reap further profits on existing technology, wringing every last cent out of Ethernet and token-ring R&D.

All the while, the vendors banking on ATM to hit it big in 1996 are understandably getting nervous. Vendors large and small have the accountants looking over their shoulders. The gold rush mentality rampant in the ATM community raised expectations quite high. After years of pouring out money, investors want to see a return.

The effect on the Big Three is minimal since so little of their business currently revolves around ATM. However, the effect of this drought on ATM-only firms could be dramatic. Some may simply go out of business. Others, weakened, may become easy (and cheap) acquisition targets. Still others may be forced to work backward and hurriedly acquire LAN switching technology to bolster sales.

Once enough switches have been sold and ATM-only firms have experienced sufficient pain, the ATM market will pick up steam again — this time with the unequivocal support of the Big Three.

Until then, you will need to become more adept at understanding the true meaning of vendor positions on ATM. It may be that vendors are much more concerned about what ATM means for their business plans than for yours.

You can help keep ATM vendors on track by prodding them to get real. Some vendors are so enamored of ATM's ultra high-tech uses that it is often easier to get information on the use of ATM for battlefield medical imaging than it is to find out when vendors plan to make drivers available for critical corporate platforms such as Windows NT Server.

You should also educate yourself about ATM and gain some experience with real ATM products. These are the most important things you can do to make sure you're ready when ATM comes into fashion once again.

*Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (908) 528-3300 or via the Internet at ktolly@tolly.com.*

INTERNET LAW

# Securing your domain name can be risky business

**Carl Oppedahl**

Do you have a .COM domain name? Would it be a problem if your business were to lose this domain name? Then read on.

Until last July, if you had an Internet domain name and wanted to minimize your risk of losing it, basically all you had to do was avoid infringing anybody's trademark. You could rest secure in the knowledge that anyone seeking to take away your domain name would have to go to court to do so. If you weren't infringing a trademark, the judge would throw out the case.


If your domain name is in a two-letter country domain, .US for example, then this is still the case. But if your domain name is in one of the three-letter domains, such as .COM and .NET, administered by Network Solutions, Inc. via the Internet Network Information Center (InterNIC), then it is important to know that your risk of losing your domain name changed drastically last July.

At that time, InterNIC put into effect a trademark domain policy that turned upside down the relationship between you and somebody looking to take your domain name from you. The policy, which was revised in November, leaves any .COM or .NET domain name owner subject to various new risks relating to loss of a domain name. (The InterNIC policy may be found at http://rs.internic.net/domain-info/internic-domain-4.html.)

For example, say you don't have a federal trademark registration identical to your domain name and someone else does, and that federal trademark is older than your domain name. The trademark owner can write a letter to InterNIC stating that it has a federal trademark registration. InterNIC will then send you a "30-day letter" stating that you will lose your domain name in 30 days unless you can prove that you have a federal trademark registration.

In such a situation, one option you have is to obtain a federal trademark registration from one of the countries that grants trademarks quickly, such as Tunisia. When you receive the trademark registration certificate, you present it to InterNIC. At this point, you might think your domain name is safe, but it's not. InterNIC may then, according to its policy, require you to sign an indemnification agreement or post a bond — or both — within 14 days, or you will lose your domain name.

The indemnification agreement says that in the event a trademark owner files a lawsuit, InterNIC gets to hire its own lawyers and spend all the money it wishes — and you have to pay the bill or lose your domain name. Obviously, it would be a good idea to obtain legal counsel before signing such an agreement.

The amount of the bond you must post, which InterNIC will apply toward its legal expenses in the event of a lawsuit, is left solely to InterNIC's discretion. You may wish to consult with your lawyer about this, as well.

Now suppose you have a trademark registration identical to your domain name, but someone else does, too.

Under InterNIC policy, the other party can still file a challenge, and InterNIC will then require you to sign an indemnification agreement or post a bond, or both, within 14 days. If you fail to comply, your domain name gets cut off.

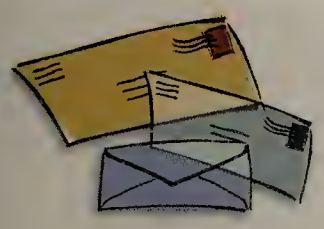
Finally, suppose someone has a trademark registration identical to your domain name, but it is newer than your domain name.

Under InterNIC policy, the other party can still file a challenge. Then — you guessed it — InterNIC will require you to sign an indemnification agreement or post a bond, or both, within 14 days, or you can say good-bye to your domain name.

In the face of these risks, the first thing you should do is learn more about InterNIC policy. It is discussed at length in the What's in a name? Web site at http://www.law.georgetown.edu/lc/internic/domain1.html. The second and perhaps most important thing you can do is to seek the advice of competent counsel experienced with Internet domain name issues. Steps that your counsel may recommend you take may include applying for trademark registrations and making backup plans for the use of alternative domain names (or numerical IP addresses) in the event you receive a 30-day letter from InterNIC.

*Oppedahl is a partner of Oppedahl & Larson, an intellectual property law firm in Yorktown Heights, N.Y. He can be reached at (914) 245-3252 or via the Internet at oppedahl@patents.com.*

# MESSAGE QUEUE



## Anniversary notes

I disagree with your contention that Unix is one of the Top 10 networking flops of the past 10 years (April 29, page 105). There are still a lot of Unix licenses being shipped and mission-critical Unix applications being run. There is a lot of Unix look and feel in Windows NT, as well as in bits of VMS, CP/M and Multics.

Modern operating systems are incremental improvements of their predecessors. We can't afford to toss all of those old legacy applications anymore, so each new operating system will need to build upon the shoulders of Unix.

I wouldn't say that Unix is on its deathbed quite yet. It continues to adapt and prosper.

*John Scoggin*
*Staff technical consultant, advanced technologies*
*Delmarva Power & Light Co.*
*Newark, Del.*

Rather than listing 10 technology successes and failures, a better idea might have been to list 10 technologies that could have been more successful but have made and continue to make a tremendous difference. Unix would have fallen in that category.

What is the model for what Windows NT is trying to become? Unix.

What is the standard for NT performance now and in the foreseeable future? Unix.

I don't know a single Unix command, but I use a Unix desktop, IBM's AIX. AIX's interface is far better than NT's, and AIX has far more robustness, versatility and features than NT.

What does NT have to compare with AIX's Network Installation Manager, System Object Model and Distributed Computing Environment?

Nothing.

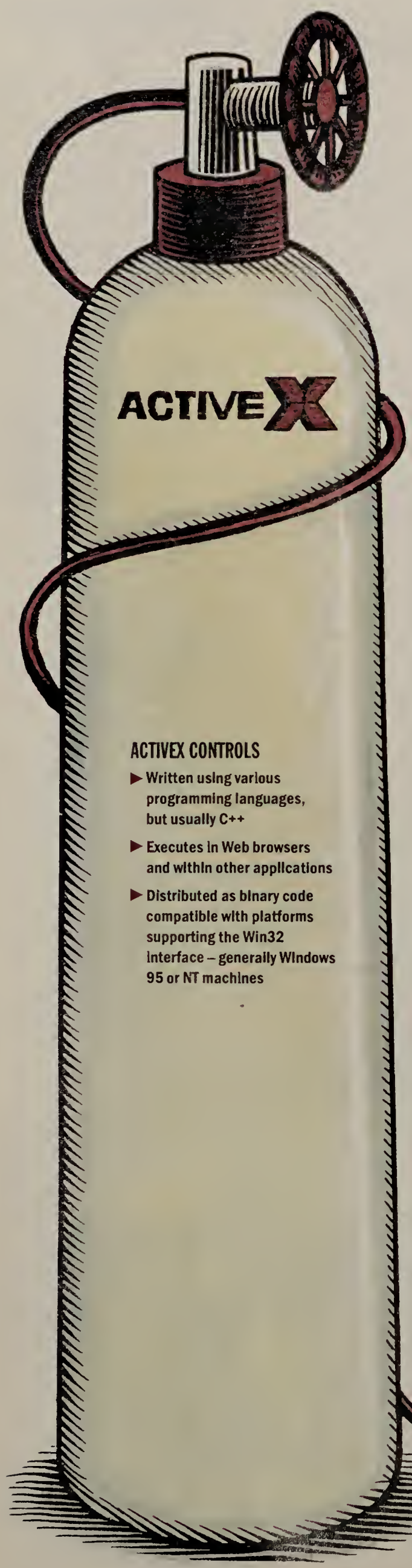
*Gene Mosher*
*President*
*ViewTouch, Inc.*
*Eugene, Ore.*


Congratulations on both your 10th anniversary and your outstanding 10th anniversary issue.

The special supplement does a terrific job of putting our rapidly changing industry into perspective and giving all of us who must survive the daily wars a better sense of where we are headed.

I look forward to benefitting from another 10 years of weekly perspectives from *Network World.*

*Jeffrey Kaplan*
*Director of strategic marketing*
*International Network Services*
*Quincy, Mass.*




LOOKING TO PUT SOME SPARKLE AND LIFE

# ActiveX controls V

By David

The World-Wide Web has become an indispensable tool in a remarkably short time. As a way to quickly publish and access information, be it for internal or external consumption, there's nothing like it. But the best is yet to be — the Web is coming alive. Developers around the world are creating software components that allow the creation of Web pages with active content.

These developers face a choice, however: Should those components be written as Java applets or as Microsoft Corp. ActiveX controls? Both provide the ability to create active Web pages, and each has strengths and weaknesses. Examining the differences between the two in several key areas will help you decide which makes the most sense for your organization.

### Components and the Web

Component software, which has to do with building applications from reusable parts, is an attractive idea. The fundamental notion is to create an application by plugging software components into some kind of container. The components may be specifically written for an application or, better yet, reused from some other project or purchased off the shelf.

The goal is to create more reliable applications more quickly and to spend less money doing it. In many ways, the idea is similar to object-oriented development, but components can offer a bit more than typical object technologies.

Visual Basic is perhaps the most common example of a container, and the components it uses are typically loaded when needed from a machine's local disk or a file server. But there's no reason other kinds of software can't also act as containers, and file servers aren't the only source for components residing somewhere in the network.

A Web browser, such as Netscape Communications Corp.'s Navigator or Microsoft's Internet Explorer, can also play the role of a container. And components can be loaded not just from the local disk or a file server, but also from a Web server located on a corporate intranet or the Internet.

The ability to support active content means we're no longer constrained to downloading into our browsers just dead bits — text, JPEG files and such — but can now load executable code, too. So you can create Web pages, for example, where data is downloaded along with the code required to work with that data.

But this approach allows much more than just creating Web pages with fancier graphics. The provider of a specialized data service, for example, might supply a viewer with that data, allowing a user who accesses the service to manipulate the data in powerful ways. This viewer is a component — one loaded as needed from the network — that runs inside the container provided by the Web browser.

One way to create Web pages with active content is to embed executable scripts in HTML-defined Web pages. Netscape's JavaScript allows this, as does Microsoft's Visual Basic Script.

For more complex components, however, these relatively simple tools won't suffice — something more powerful is required. The two most visible technologies for building powerful, downloadable components are Java applets and ActiveX controls, formerly called OLE controls or OCXs.

INTO YOUR APPLICATIONS? CHOOSE YOUR TOOL:

# Java applets

**Chappell**

The term Java is commonly used to refer to distinct but related things. Java is a programming language created by Sun Microsystems, Inc. In many ways, it is a simpler, and to many, a better, C++. Java also defines a number of standard APIs, allowing generic access to items such as a graphical user interface and other systems services.

It's entirely legitimate to write stand-alone applications using Java. So far, however, most of the considerable excitement about this new language environment has focused not on Java applications, but rather on Java applets.

An applet is a software component that typically runs inside some kind of container. By far the most common example of a container for Java applets is a Web browser such as Netscape Navigator.

When a Java applet is downloaded from a Web server, it sends a partially translated version of the applet program, expressed in the Java byte code, to the browser.

As shown on page 48, the browser contains an implementation of the Java virtual machine — software that is capable of executing the byte code instructions. The browser also has a standard set of class libraries that the applet can trust will be there. The virtual machine executes the applet, and the user sees the result.

**SUMMARIZING THE COMPARISON**

| | Java applets | ActiveX controls |
|---|---|---|
| Runs in a variety of containers, not just Web browsers | No | Yes |
| Platform independent | Yes | No |
| Execution style | Interpreted | Compiled |
| Supports sandboxing for security | Yes | No |
| Allows complete local system access | No | Yes |

### ActiveX controls

Like Java applets, ActiveX controls are self-contained pieces of functionality that run inside some kind of container. And, as with Java applets, a Web browser is a good choice for that container, allowing ActiveX controls to be embedded in Web pages and downloaded on demand.

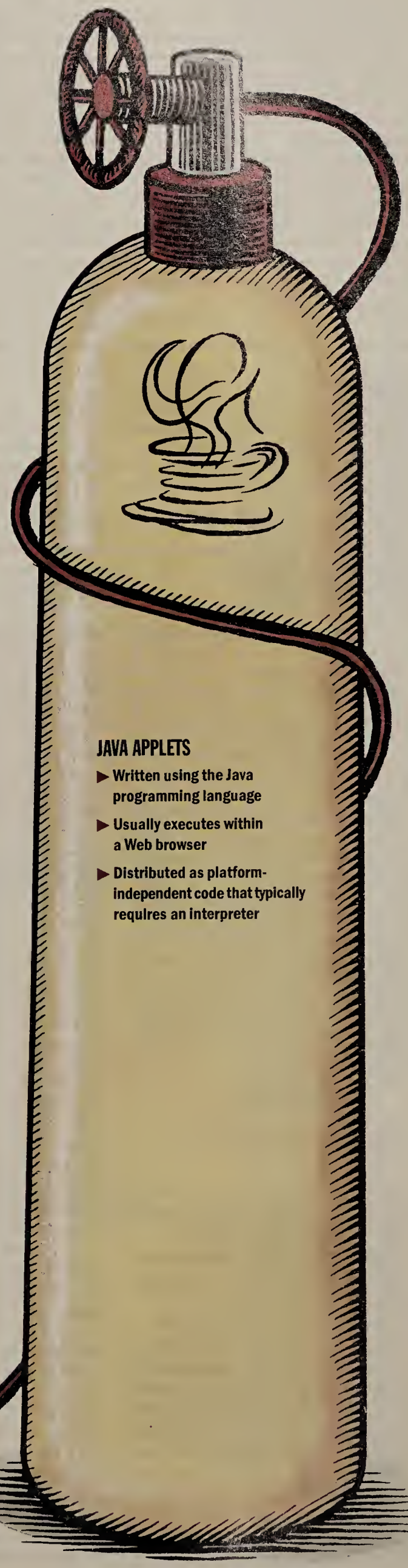
Unlike Java applets, however, ActiveX controls can be written in various languages. In fact, it may at some point be possible to write ActiveX controls in Java, although the most common choice today by a wide margin is C++.

Also, Java applets are downloaded in a machine-independent format and usually interpreted within the browser, while ActiveX controls are binaries. The typical target system for an ActiveX control is, not surprisingly, one based on an Intel Corp. processor that supports the Win32 interface, which generally means that it is running Windows 95 or Windows NT.

How do ActiveX controls compare with Java applets? How can a developer decide which one to use? Answering these questions requires looking at both technologies from a number of perspectives.

### Containers

Components, by definition, can't survive on their own; they require some kind of container in which to execute. Java applets today are supported primarily by only one kind of container: Web browsers. Net-




DAN KROVATIN

scape's browser currently supports Java applets, and Microsoft's soon will.

ActiveX controls, on the other hand, are supported by all kinds of containers. Microsoft changed the name from OLE controls to ActiveX controls to emphasize their newly added Internet-related capabilities. They are the most common type of component by far.

Many organizations offer a plethora of different ActiveX controls, most currently unrelated to the creation of active Web pages. A casual perusal of magazine advertisements aimed at Visual Basic programmers will yield controls implementing spreadsheets, mainframe connectivity, voice recognition and much more.

Despite being created with other environments in mind, many of these existing controls can be downloaded and executed within an ActiveX-capable browser. This means there is an instant supply of available ActiveX components for creating active Web pages. But unless more containers capable of hosting Java applets emerge, those applets are destined to remain cordoned off in the Web browser ghetto. It's not a bad place to be, to be sure, but it is a limited part of the picture.

### Platform Independence

On the other hand, Java applets are platform-independent. The same applet can run on any system that supports the Java environment. ActiveX controls are not; they generally run only on Windows/Intel systems (although Microsoft is making noise about someday allowing the creation of ActiveX controls in Visual Basic, then interpreting them on all kinds of clients).

Implicit in the question of platform independence is a debate about compilation vs. interpretation. Java applets are platform-independent because they're typically interpreted. This means that the applets' code is executed by the Java virtual machine rather than directly by the underlying hardware, although just-in-time Java compilers might change this by compiling an applet's byte code on arrival. In general, interpreted applications run on the order of 10 times slower than compiled applications.

Does this matter? It depends. As processor speeds increase, this difference may be less and less significant. Still, imagine how happy your users would be if all their applications suddenly ran 10 times slower than they do today.

Ultimately, the importance of platform independence hinges on the target environment. An independent software vendor focused on the Web and writing for the largest possible market may well choose to create Java applets because they are guaranteed to run on anything, no questions asked. A developer in an organization with all or even mostly Windows/Windows NT clients may instead opt to create ActiveX controls for the reasons previously cited: performance and the ability to run in many kinds of containers, not just in browsers.

### Security

Similarly, evaluating the security features of the two development environments largely comes down to the kind of applications you want to write.

Users download code from networked servers all the time — that's what file servers are for. When the code is downloaded from a Web server, though, the picture gets murkier. Loading a component from a Web server that is part of an internal intranet is no different than loading it off an internal file server. Loading the component off some Web server on the Internet, however, is quite different and introduces much more risk.

There are three fundamental approaches to security for components loaded from Web servers. The first is the one just mentioned: trust the server. Some well-managed Web servers, such as those on a secure corporate intranet, can be trusted not to deliver components that contain viruses or otherwise do damage to the system on which they are loaded and executed. Today, we trust our corporate file servers to do this very thing, so it doesn't seem unreasonable to place this same faith in internal Web servers.

A second approach is to constrain the components themselves, making it impossible for them to execute functions that might do damage to the local system. Commonly called sandboxing (because downloaded components are obligated to play only in their own sandbox), the approach can guarantee security. The downside is that sandboxed components are prohibited from doing things that can sometimes be useful, such as writing to a file on the client machine's local disk.

The third and, in some ways, most attractive option is to digitally sign each downloaded component. The digital signature can be checked by the browser that receives the component. If it is correct, the browser can be certain that the component was created by a specific trusted entity — such as Lotus Development Corp. or Microsoft, or your organization's internal development staff — and that it hasn't been modified.

Java applets currently support the first and second of these methods. Like any piece of code, they can be downloaded from a trusted server, and Java applets are designed wonderfully for sandboxing. By running all applet code through a verifier, the Java environment can all but guarantee that a downloaded applet won't step outside its defined limits to wreak havoc on the machine.

ActiveX controls, on the other hand, currently support only the first of these three methods: downloading from a trusted server. Because they are shipped to the client as binaries and directly executed, it is hard to see how sandboxing would be possible with ActiveX controls. Still, there are times when allowing a downloaded component access to, say, the local disk can be useful, so sandboxing is not appropriate for all applications.

Both the Java and ActiveX camps are working on techniques to allow digital signatures on downloadable components. Sadly, the two groups are not working together. Digital signatures offer the most general solution, one that would work well with both technologies, and having different techniques for Java applets and ActiveX controls makes no sense.

### Making a choice

Both Java applets and ActiveX controls will exist into the foreseeable future. The leading browsers, Netscape Navigator and Microsoft's Internet Explorer, will support both. But for organizations building component applications using browsers as containers, it's really not all that difficult to decide which technology to use.

If a component must run on different kinds of client systems and if the limitations imposed by sandboxing are acceptable or outright desirable, then building that component as a Java applet makes sense. An example of this kind of component might be a customized data viewer, such as the one mentioned earlier, that will be distributed over the Internet to a diverse set of clients. Support for heterogeneous platforms is essential here, as probably are the security and concomitant limitations imposed by sandboxing.

If, on the other hand, the component is targeted for Microsoft systems, does not require sandboxing, must run as efficiently as possible and is useful in a wider range of containers than just Web browsers, ActiveX controls are the technology of choice.

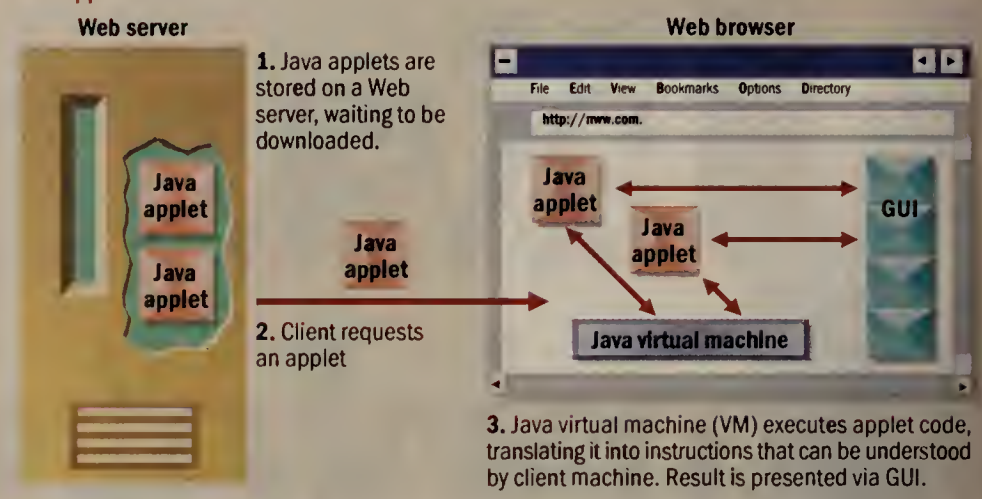
An example here might be a component performing specialized mortgage calculations for financial institutions. In many markets, it's a safe bet that the clients run Windows or Windows NT. And because this component is sold rather than distributed freely over the Internet, it will likely be loaded from trusted servers within the buyer's intranet, obviating the need for sandboxing. And finally, a component such as this is quite likely to be useful in many kinds of applications built using many kinds of containers, not just Web browsers.

Building applications from existing components is a good idea. Allowing those components to be accessed and loaded over the Web is an even better idea. And having two technologies that address this area, technologies that both compete with and complement each other, is likely to make both better over time. As Martha Stewart would say, it's a good thing.

*Chappell is principal of Chappell & Associates, an education and consulting firm in Minneapolis. He can be reached at www.chappellassoc.com.*

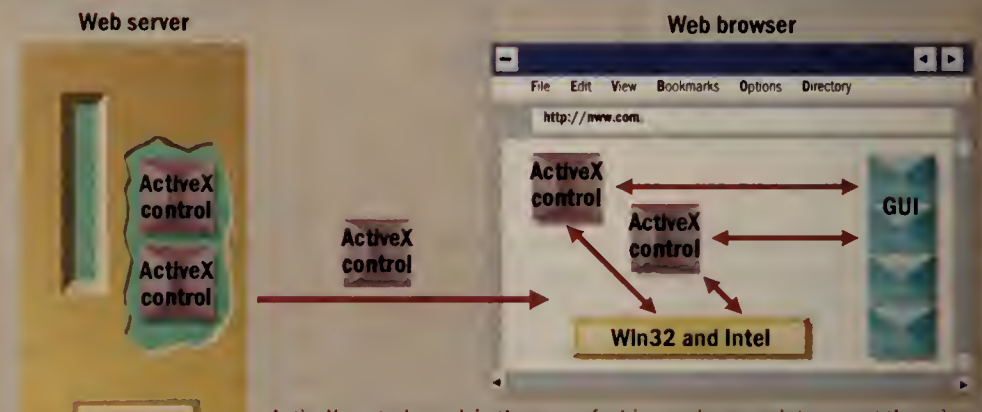
## IT'S ALL IN THE EXECUTION

**How Java applets work**




3. Java virtual machine (VM) executes applet code, translating it into instructions that can be understood by client machine. Result is presented via GUI.

**How ActiveX controls work**




ActiveX controls work in the same fashion as Java applets except there is nothing analogous to the Java VM. Instead, they use the Win32 API and execute directly in Windows on an Intel-based machine.

NetworkWorld Fusion

**Some of the better online resources we've found on ActiveX and Java include:**

- **A Microsoft ActiveX primer with links to sites offering information on development tools, viewers and more.**
- **Microsoft's ActiveX development kit.**
- **A Sun site offering Java-related primers, news, products, services and developer info.**
- **Cafe Au Lait, a site maintained by Elliotte Rusty Harold, a consultant with JPE Associates in New York, that offers links to Java product news, a FAQ, tutorial and training info, and even Java quizzes.**

**Select NetRef, Technology Resources then Java.**

**http://www.nwfusion.com**

FREE PRODUCT INFO

READER SERVICE CARDS

# Reader Service Card

**IT'S EASY.** Circle the number on this card which corresponds to the number at the bottom of the advertisement. Mail or FAX to (413) 637-4343 today. Information will be provided to you FREE of charge.

Circle the number below which corresponds to the number at the bottom of the advertisement for more information.

**LAN WORLD**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |

**DISPLAY ADVERTISING**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 |
| 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 |
| 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 |
| 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 |
| 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 |
| 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 |
| 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 |
| 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 |
| 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 |
| 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 |
| 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 |

**MARKETPLACE**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 |
| 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 |
| 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 |
| 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 |
| 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 |
| 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 |
| 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 |
| 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 |
| 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 |
| 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 |
| 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 |
| 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 |
| 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 |
| 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 |
| 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 |
| 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 |
| 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 |
| 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 |

Please check all of the products for which you are interested in receiving FREE information.

**COMPUTERS/PERIPHERALS**
- 600 ☐ Backup Devices
- 601 ☐ Cabling and Cabling Systems
- 602 ☐ Micros/PCs
- 603 ☐ Mainframes
- 604 ☐ Minis
- 605 ☐ Printers
- 606 ☐ Storage Devices
- 607 ☐ Terminals
- 608 ☐ UPS
- 609 ☐ Workstations

**SOFTWARE**
- 610 ☐ Applications
- 611 ☐ Client/Server Application Development
- 612 ☐ Communication/Terminal Emulation
- 613 ☐ Computer Operating Systems
- 614 ☐ Database Management/RDBMS
- 615 ☐ E-Mail
- 616 ☐ Groupware
- 617 ☐ LAN Operating Systems
- 618 ☐ Network Diagramming
- 619 ☐ Network Management
- 620 ☐ Security
- 621 ☐ Suites
- 622 ☐ Systems Management

**INTERNETWORKING**
- 623 ☐ Bridges
- 624 ☐ Routers
- 625 ☐ Gateways

**LOCAL AREA NETWORKS**
- 626 ☐ ATM Switches
- 627 ☐ Ethernet Switches
- 659 ☐ Fax Servers
- 628 ☐ Hubs/Intelligent Hubs
- 629 ☐ LAN Servers
- 630 ☐ Local Area Networks
- 631 ☐ Network Adapter Boards/NICs
- 632 ☐ Peer-to-Peer LANs
- 633 ☐ Print Servers
- 634 ☐ Remote LAN Access
- 635 ☐ Remote Access/ Communication Servers
- 660 ☐ Security
- 636 ☐ SNMP Network Management
- 661 ☐ Storage
- 637 ☐ Superservers
- 638 ☐ Wireless Networks

**REMOTE/WIRELESS COMPUTING**
- 639 ☐ Laptops, Notebooks
- 640 ☐ PCMCIA
- 641 ☐ Mobile Data Equipment and Services
- 642 ☐ Wireless Data Equipment and Services

**WAN EQUIPMENT AND SERVICES**
- 643 ☐ ATM
- 644 ☐ CIT (Computer Integrated Telephony)
- 645 ☐ Diagnostic, Monitoring and Test Equipment
- 646 ☐ DSU/CSU
- 647 ☐ E-Mail/On-Line Services
- 648 ☐ FAX Boards/Modems
- 649 ☐ Fiber Dptics
- 650 ☐ Frame Relay
- 651 ☐ ISDN
- 652 ☐ Modems
- 653 ☐ PBX
- 662 ☐ Security
- 654 ☐ SMDS
- 655 ☐ T1, T3, Fractional T1 Mux and Services
- 656 ☐ Videoconferencing/ Teleconferencing
- 657 ☐ WATS/MTS

**INTERNET/ELECTRONIC COMMERCE**
- 658 ☐ Internet Access Providers/Services
- 659 ☐ Firewalls
- 660 ☐ Web Servers
- 661 ☐ Internet Software Tools

**OTHER**
- 662 ☐ Education and Training
- 663 ☐ Storage Cabinets/Furniture

NetworkWorld

ISSUE DATE 5/27/96

CARD MUST BE RECEIVED BY 8/27/96

NAME

TITLE

COMPANY

STREET

CITY/STATE/ZIP

( )
PHONE

( )
FAX

E-MAIL ADDRESS

FILL OUT, DETACH AND MAIL

## Now it's easy to find valuable information on the latest products and services with *Network World's* Reader Service Card – FREE!

FILL OUT, DETACH AND MAIL


# Reader Service Card

**IT'S EASY.** Circle the number on this card which corresponds to the number at the bottom of the advertisement. Mail or FAX to (413) 637-4343 today. Information will be provided to you FREE of charge.

Circle the number below which corresponds to the number at the bottom of the advertisement for more information.

**LAN WORLD**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |

**DISPLAY ADVERTISING**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 |
| 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 |
| 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 |
| 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 |
| 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 |
| 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 |
| 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 |
| 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 |
| 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 |
| 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 |
| 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 |
| 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 |

**MARKETPLACE**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 |
| 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 |
| 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 |
| 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 |
| 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 |
| 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 |
| 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 |
| 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 |
| 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 |
| 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 |
| 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 |
| 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 |
| 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 |
| 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 |
| 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 |
| 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 |
| 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 |
| 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 |

Please check all of the products for which you are interested in receiving FREE information.

**COMPUTERS/PERIPHERALS**
- 600 ☐ Backup Devices
- 601 ☐ Cabling and Cabling Systems
- 602 ☐ Micros/PCs
- 603 ☐ Mainframes
- 604 ☐ Minis
- 605 ☐ Printers
- 606 ☐ Storage Devices
- 607 ☐ Terminals
- 608 ☐ UPS
- 609 ☐ Workstations

**SOFTWARE**
- 610 ☐ Applications
- 611 ☐ Client/Server Application Development
- 612 ☐ Communication/Terminal Emulation
- 613 ☐ Computer Operating Systems
- 614 ☐ Database Management/RDBMS
- 615 ☐ E-Mail
- 616 ☐ Groupware
- 617 ☐ LAN Operating Systems
- 618 ☐ Network Diagramming
- 619 ☐ Network Management
- 620 ☐ Security
- 621 ☐ Suites
- 622 ☐ Systems Management

**INTERNETWORKING**
- 623 ☐ Bridges
- 624 ☐ Routers
- 625 ☐ Gateways

**LOCAL AREA NETWORKS**
- 626 ☐ ATM Switches
- 627 ☐ Ethernet Switches
- 659 ☐ Fax Servers
- 628 ☐ Hubs/Intelligent Hubs
- 629 ☐ LAN Servers
- 630 ☐ Local Area Networks
- 631 ☐ Network Adapter Boards/NICs
- 632 ☐ Peer-to-Peer LANs
- 633 ☐ Print Servers
- 634 ☐ Remote LAN Access
- 635 ☐ Remote Access/ Communication Servers
- 660 ☐ Security
- 636 ☐ SNMP Network Management
- 661 ☐ Storage
- 637 ☐ Superservers
- 638 ☐ Wireless Networks

**REMOTE/WIRELESS COMPUTING**
- 639 ☐ Laptops, Notebooks
- 640 ☐ PCMCIA
- 641 ☐ Mobile Data Equipment and Services
- 642 ☐ Wireless Data Equipment and Services

**WAN EQUIPMENT AND SERVICES**
- 643 ☐ ATM
- 644 ☐ CIT (Computer Integrated Telephony)
- 645 ☐ Diagnostic, Monitoring and Test Equipment
- 646 ☐ DSU/CSU
- 647 ☐ E-Mail/On-Line Services
- 648 ☐ FAX Boards/Modems
- 649 ☐ Fiber Dptics
- 650 ☐ Frame Relay
- 651 ☐ ISDN
- 652 ☐ Modems
- 653 ☐ PBX
- 662 ☐ Security
- 654 ☐ SMDS
- 655 ☐ T1, T3, Fractional T1 Mux and Services
- 656 ☐ Videoconferencing/ Teleconferencing
- 657 ☐ WATS/MTS

**INTERNET/ELECTRONIC COMMERCE**
- 658 ☐ Internet Access Providers/Services
- 659 ☐ Firewalls
- 660 ☐ Web Servers
- 661 ☐ Internet Software Tools

**OTHER**
- 662 ☐ Education and Training
- 663 ☐ Storage Cabinets/Furniture

NetworkWorld

ISSUE DATE 5/27/96

CARD MUST BE RECEIVED BY 8/27/96


PASS ALONG

Pass this card along to a colleague so they, too, can get valuable product information FREE.

NAME

TITLE

COMPANY

STREET

CITY/STATE/ZIP

PHONE
( )

FAX
( )

E-MAIL ADDRESS

FREE Product Info

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

**BUSINESS REPLY MAIL**
FIRST CLASS MAIL PERMIT NO. 716 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

**NetworkWorld**

PO BOX 5090
PITTSFIELD MA 01203-9838

**Your resource for enterprise network computing information.**

FREE Product Info

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 716 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

NetworkWorld

PO BOX 5090
PITTSFIELD MA 01203-9838

FREE Product Info

# America II

*Continued from page 1*

That act didn't win Mullicane many friends among sales executives at the hotly competitive electronics concern, but it broadcast a message that rippled through the organization: Information systems — long pushed around by sales chiefs with their own computing fiefdoms — intended to reel in control of the company's computing and network resources.

And with good reason. Chief Executive Officer Michael Galinski hired Mullicane, a self-proclaimed IS emergency medical technician, to stop network seizures that were costing the company upward of $2 million annually.

Outages weren't just occasional nuisances; network and system integrity screamed for improvement. Consider that out of 160 hours of work time per month, the network was down an average of 21 hours — or 13% of the time.

The network was made up of almost 500 diskless PCs, each a different make, slapped together with various network interface cards and often incompatible drivers. A Thomas Conrad Network System (TCNS) 100M bit/sec Arcnet shared-bandwidth backbone linked the PCs to 10 NetWare servers scattered haphazardly across the company. An operations center server, for instance, sat perched on a file cabinet.

The mix of computing gear was the result of the IS department having little authority over the firm's 11 independent lines of business, each intent on buying its own products. Mullicane knew he was in for a major fight to bring order to the network and to wrest control of IS.

"It was like going into a three-minute round with Mike Tyson that lasted for hours," Mullicane says.

Out of 16 IS employees on hand when Mullicane arrived, he kept only four. He then handpicked his own team, luring technical experts from IBM Advantis, Compaq Computer Corp., State Street Bank and elsewhere.

The team of 20 was about to stretch its technical knowledge to new limits, and be pushed and prodded constantly by its driven leader.

"There was so much on the plate," says Jim Murphee, help desk and network administration manager. Murphee was the brains behind getting NetWare 4.1's Novell Directory Services (NDS) to run smoothly on the new net. "We didn't think any one person could get it done, so we all did our part and then tried to help out where we could."

### Weighty issue

Last June 9, Mullicane submitted his three-year plan for network stabilization to management. Two months later, his team began constructing a new data center, squeezing out part of the company's weight training area to make room. By December, the team was gutting the existing installation — even down to the wiring — and rebuilding it.

America II's greatest problem was network downtime, so Mullicane and his new staff set out to design a reliable switched backbone that would not saturate the way the shared-bandwidth 100M bit/sec Arcnet did.

"We decided bandwidth was not going to be an issue," Mullicane says.

From a political standpoint, Mullicane had to show different company factions that IS had committed to change its unreliable image, says Howard Marks, president of Networks Are Our Lives, Inc., a consultancy hired to provide network design advice.

"We ended up with massive overkill," Marks says. "But America II has some unique applications, and we could not determine the capacity needs. So, not knowing how many enemies we had, we just decided to kill them all."

America II installed a pair of Digital Equipment Corp. DEC FDDI GigaSwitches at the heart of its data center (see graphic). Both GigaSwitches support dual-homed switched FDDI connections to 13 pods — basically workgroup-area 10Base-T hubs — and to eight data center servers. One GigaSwitch services all connections, while the second unit sits by ready to take over in the event the primary fails.

Redundancy is a theme that jumps out all across America II's network operations, from the dual-homed FDDI connections to mirrored servers to extra wiring.

Under Mullicane, the company also moved to a single Compaq Proliant 1500 server to simplify log-in security, administration and software version control. It also runs the bulk of the firm's office automation applications.

VICTOR GLORIANO

**The network IS crew of America II:** *(from left) Brian Barkauskas, Steve Mueller, Richard Haworth, Andrew Sroka, Robert DeJonge, James Bennett, Scott Nanni and Michael Mullicane.*

After months of planning, vendor evaluations and analysis, Mullicane's crew set to work installing the new network just prior to the Christmas holiday there was a 13-day window before the network had to be back in operation by January 2.

They swapped out 500 PC workstations by using three teams of volunteers that followed carefully scripted instructions for unpacking and setting up the new PCs. The PC conversion started on a Tuesday morning and wrapped up Sunday afternoon, Christmas Eve day.

Things weren't going so smoothly in the data center. Murphee, who labored endlessly on NetWare 4's NDS, couldn't get the directory to port over from the old network servers to the new machines.

The decision was made early on to bridge the two nets by passing directory data between two NDS servers — one on the old net and one on the new — each with the same tree name. But the team couldn't get the data flowing to the new net.

It was a critical stage in keeping the project on track — so much so that Mullicane gathered his staff late that afternoon and told them if they couldn't succeed in porting the directory data onto the new servers, he'd stay to work the problem out, missing his flight home to California and the chance to spend Christmas with his family.

Calls to Novell, Inc.'s NDS technicians didn't do much good; they were stumped, too. As the clock ticked away, past 4 p.m., then past 5, Murphee decided to bring up an old NetWare server on the Arcnet LAN to generate a replica of the directory.

Having done that, they carted the server over to the new data center and attached it to the net, where it proceeded to populate the new directory. That's when the team learned its valuable lesson that NetWare 4 would not recognize two directory trees bearing the same name.

Mullicane just made his flight home for the holiday.

### Delivering big

When America II's management team gave the nod last June to Mullicane's ambitious network project, it handed him a budget of $3.83 million. Upon completion of the project in March, Mullicane had spent $3.3 million — coming in 15% under budget.

Budget dollars aside, the impact of the net infrastructure on operations has been nothing short of revolutionary. Business operations reports, which typically required 90 minutes to spit out under the old system, now can be cranked out in 12 to 17 minutes. Running a backup of the company's inventory database used to require four machines running full bore for 7 hours. Now the 16G bytes of data is backed up in just 45 minutes — with less than 30 seconds of actual network downtime since one of the mirrored servers is diverted to handle the task.

But the real proof of the pudding is in network availability. Since the early January cutover, Mullicane's network is averaging 99.8% uptime.

There have been considerable financial savings, too. The uptime improvements alone have saved the company $180,921 per month in what otherwise would amount to lost profits. On top of that, the deployment of a LAN-based desktop fax service saves a little more than $40,000 a month in personnel handling costs.

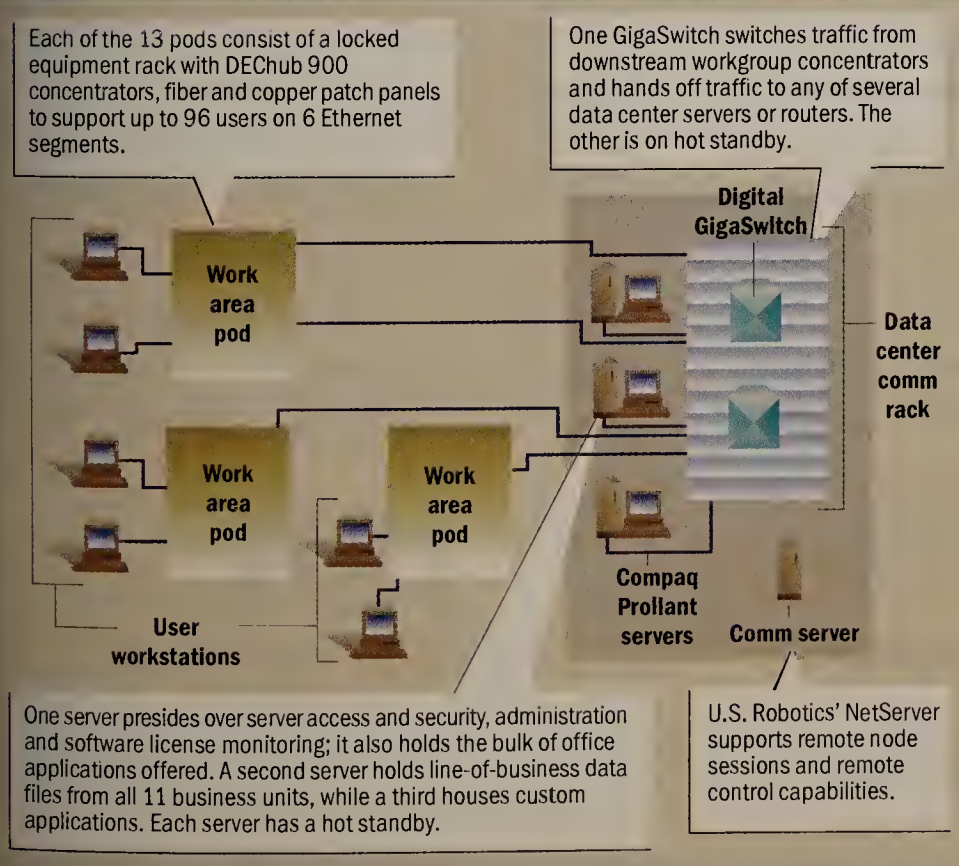
And electronic mail system enhancements — the company dumped a troublesome E-mail system in favor of Novell's GroupWise — garnered $50,000 monthly from productivity gains. Meanwhile, deployment of CD-ROM services, such as online pricing tables, business application reference tables and technical manuals, generates $20,000 in productivity gains. The bottom line is that the monthly savings amount to a little more than $291,000.

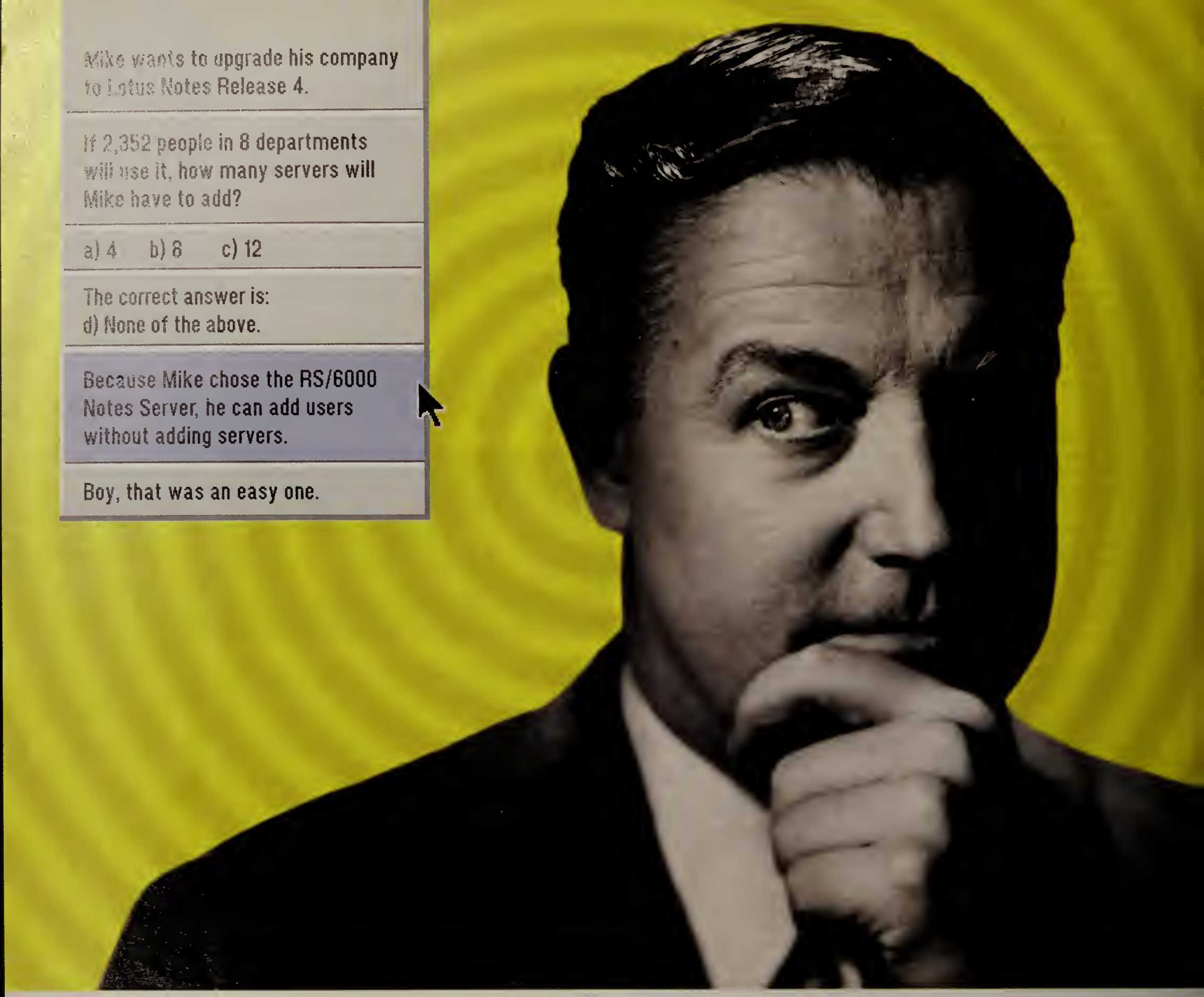
Perhaps the greatest payoff, though, is that IS is now a hotbed of activity — constantly mulling new network services that will enable sales teams to collaborate and contribute toward revenue generation.

Moreover, the company's sales force knows now that IS is not the constraining factor it was in years past.

"In other words," Mullicane says, "no one can use us as an excuse anymore." ■

## America II's data center layout






**Can your Notes server do this?**

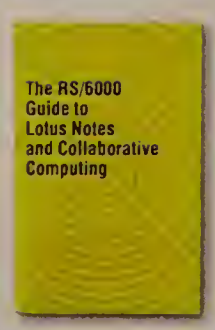
While Lotus Notes® Release 4 can be the answer to your collaborative computing prayers, it can also raise some important questions. Like how many servers will you need to handle the added users Notes™ Release 4 supports? Fortunately, there's a rather simple solution: the RS/6000™ Notes Server.

By consolidating your existing servers with the UNIX®-based RS/6000 server, you can take on more users without bringing in more servers. And, because the RS/6000 offers unsurpassed scalability, your business can grow with it, not out of it.

What's more, the RS/6000 Notes Server lets you manage your entire network from one easy-to-access location.

Of course, you won't be left to figure things out on your own. RS/6000 specialists will help you design a customized solution that will best meet your collaborative computing needs.

The RS/6000 Notes Server. Think of it as subtraction by addition.




*How can the RS/6000 help simplify your move to Notes Release 4? For the answers, get our free booklet, "The RS/6000 Guide to Lotus Notes and Collaborative Computing." Call 1 800 IBM-3333, ext. EA230, or visit www.rs6000.ibm.com on the Net.*

IBM®

Solutions for a small planet™

NetworkWorld PC WORLD

# SERVER TEST SERIES

*IBM's PC Server 720, Tangent's Carthage and HP's NetServer 6/166 LS4*

This month, we tackle a new class of servers — those designed to fulfill the needs of large enterprises. Unlike the lower priced and lower performance workgroup servers we've tested so far, these boxes come with price tags generally more than $20,000.

To stress them in a way more reflective of how they could be used in a real environment, we put four network interface cards in each server and tested with clients accessing each segment simultaneously. While we have only 16 clients at most, each stresses a server more than a typical client. (For complete details of our enterprise tests, see our Feb. 19 issue.)

How did this month's servers fare? Both the IBM PC Server 720 and Hewlett-Packard Co.'s NetServer 5/166 LS4 turned in top-notch numbers. Each scored in the mid-50s in performance, compared to 41.5 for our best workgroup server to date, and had comparable price/performance indexes.

Because Tangent Computer, Inc. told us its Carthage server was an enterprise server, we tested it with that benchmark, but its performance was far below that of the other servers. Nevertheless, its low price boosted its price/performance results.

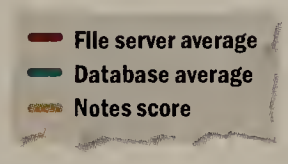
We also retested a workgroup server, Dell Computer Corp.'s PowerEdge SP 5133-2, that first appeared in our March 18 issue. We don't specify an optimal configuration for vendors, and because Dell builds each server to order, the company insisted that a different configuration would give better results. We found performance of the new unit to be a bit better, but removal of a superfluous disk drive helped the server's price/performance index.

The *Network World/PC World* Server Test Series is a monthly feature in which we evaluate file and application servers. Our testing measures performance from the client's point of view, and we report the time it takes to complete typical tasks. A complete description of our test methodology and the configuration of our Houston-based lab is available on Network World Fusion.

Our file server tests run scripts on ascending numbers of clients for four applications: Microsoft Corp.'s Word and Excel for Windows, Lotus Development Corp.'s 1-2-3 for Windows and Corel Corp.'s WordPerfect for Windows. The scripts perform file-access operations such as opening, importing and saving files.


We have two application server tests. The first is a client/server database test that uses Microsoft Access on the front end and Oracle Workgroup Database 7.2 on the back end. We perform various read and write operations on a three-table payroll management application. The other is a Notes test that uses Lotus Notes Release 4.0. We access multiple views in a database, then each document within each view.

Our performance summary graphs show the results of each test in scripts per minute, with numbers of clients ranging from one to 16. Because the tests run faster than a real client could perform the operations, each of our test clients stresses the servers as much as several real users would.




Our performance rating is derived by adding the file server performance in scripts per minute to the average of the two application server tests, at the 16-client level.

We then divide the price of the server as tested by the performance rating to get our price/performance index.



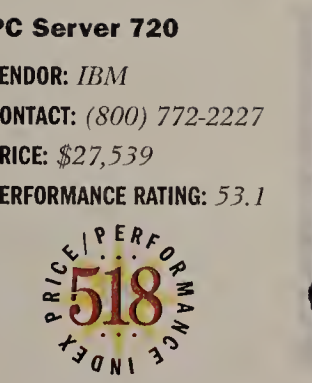
**PC Server 720**

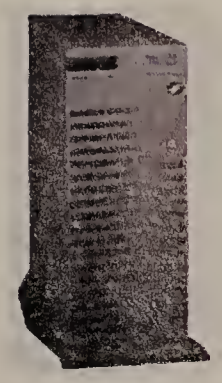
**VENDOR:** *IBM*

**CONTACT:** *(800) 772-2227*

**PRICE:** *$27,539*

**PERFORMANCE RATING:** *53.1*



*Note: A lower price/performance index indicates better value.*

## WORTH NOTING

The chassis of the IBM PC Server 720 is well laid out. You can get to all 18 drive bays by unlocking and swinging down the front bezel, and to the CD-ROM and diskette drives from the locking door. The CD-ROM drive is mounted vertically for space reasons, which is a bit awkward, but it works.

Micro Channel Architecture and PCI slots are easy to access. The internals are clearly labeled to help you configure options.

Behind the bezel is a nice glove box for storing CDs or diskettes. It can be removed to add a drive. There's also room inside the case for an optional 220-watt secondary power supply.

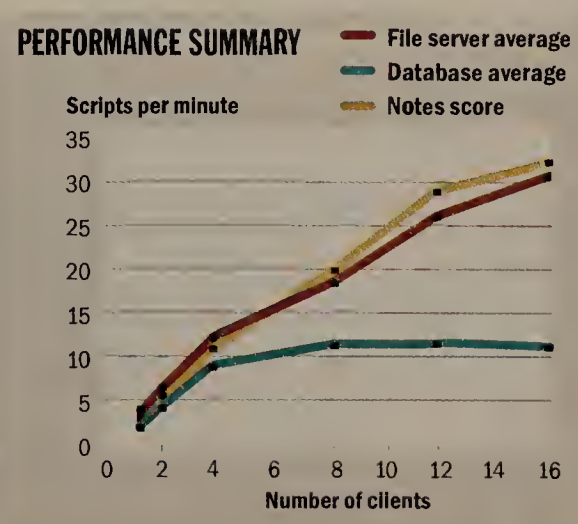
The PC Server 720 takes one to six processor cards that communicate over a Corollary, Inc. C-Bus II. Processor upgrades and SIMMs are on the cards themselves. You remove a plastic cage held on by too many screws to change the SIMM or processor configuration. We found the cage difficult to reinstall properly.

While the server is considerably heavier than the long-gone, little-lamented luggable PCs of the early '80s, the PC Server 720 is transportable — a built-in wheel in the back and a handle in the front allow you to roll it around.

IBM's User's Reference and User's Handbook documentation seem adequate. The server comes with a quick-start guide to help with setup. Together, they provide a nice combination of technical and nontechnical information.

Bundled with the server is IBM's NetFinity Web browser-based SNMP management program and the company's ServerGuide 2.5 software. ServerGuide can install OS/2 for SMP Version 2.11, SCO OpenServer 3.0 Enterprise System, Windows NT Server 3.51, NetWare 3.12 and 4.1, NetWare 4.1 SMP, and IBM's NetFinity 3.06.

The server comes with a three-year on-site warranty and 90 days of 24-hour, 7-days-a-week toll-free help.



## THE INSIDE STORY

| Model | HP NetServer 5/166 LS4 | | IBM PC Server 720 | | Tangent Carthage | |
|---|---|---|---|---|---|---|
| Processor | 4 166-MHz Pentiums each with 4 1M-byte L2 caches | | 4 133-MHz Pentiums each with 512K-byte L2 cache | | 166-MHz Pentium each with L2 cache | |
| Maximum processors | 4 166-MHz Pentiums | | 6 133-MHz Pentiums each with 512K byte L2 cache, or 2 166-MHz Pentiums | | 2 166-MHz Pentiums each with 512K bytes cache | |
| Memory | **As tested** | **Maximum** | **As tested** | **Maximum** | **As tested** | **Maximum** |
| | 128M bytes | 768M bytes | 128M bytes | 1G bytes | 64M bytes | 512M bytes |
| Slots | **Provided** | **Open** | **Provided** | **Open** | **Provided** | **Open** |
| Memory | 2 | 1 | 2 | 1 | 0 | 0 |
| PCI | 3 | 0 | 0 | 0 | 3 | 0 |
| PCI/EISA | 1 | 0 | 0 | 0 | 1 | 0 |
| PCI/MCA | 0 | 0 | 7 | 6 | 0 | 0 |
| EISA | 5 | 5 | 0 | 0 | 4 | 3 |
| MCA | 0 | 0 | 0 | 0 | 0 | 0 |
| Processor | 2 | 0 | 4 | 0 | 0 | 0 |
| Total | 13 | 6 | 13 | 7 | 8 | 3 |
| **Bays** | **Provided** | **Open** | **Provided** | **Open** | **Provided** | **Open** |
| Internal | 0 | 0 | 18 | 12 | 6 | 6 |
| External | 3 | 1 | 4 | 2 | 5 | 1 |
| External hot-plug | 6 | 2 | 0 | 0 | 0 | 0 |
| Total | 9 | 3 | 22 | 14 | 11 | 7 |
| **Storage** | | | | | | |
| Adapter | 2 integrated Adaptec AHA-7870P | | IBM SCSI-2 Fast/Wide Streaming RAID Adapter/A | | 2 Adaptec AHA-2940 PCI Fast SCSI2 | |
| Bus | PCI | | MCA | | PCI | |
| Capacity | 6.3G bytes | | 12.6G bytes (6x2.1G bytes) | | 8.6G bytes | |
| Model | 3 Seagate Barracuda ST32550WC | | Quantum Atlas XP32150W | | Quantum Atlas XP34300 | |
| Average seek time | Not available | | 8.5 msec | | 8.5 msec | |
| Transfer rate | Not available | | 49.1M bit/sec | | Not available | |
| Embedded cache | Not available | | 1024K bytes | | 1024K bytes | |
| **Maximum drive capacity** | **Internal** | **External** | **Internal** | **External** | **Internal** | **External** |
| | 25.2G bytes | 201G bytes | 40.5G bytes | 81G bytes | 36G bytes | 72G bytes |
| Base drive capacity | 1G bytes | | 4.5G bytes | | 2G bytes | |
| **CD-ROM** | Toshiba 4X SCSI | | Bootable Matsushita CR-504-B 4X | | NEC CDR-511 4X SCSI | |
| **Network adapter** | 4 Intel ProShare 10/100 Ethernet | | 4 IBM 100/10 PCI Ethernet Adapters RAID 5 drive array, hot-swappable drives | | Cogent EM960/400 | |
| **Fault tolerance features** | Hot-swappable drives, ECC memory, RAID option | | RAID 5 drive array, hot-swappable drives, ECC memory | | Hot-swappable drives (using Kensington trays), redundant load-balancing power supply | |
| **Security features** | Bezel lock | | Bezel lock, BIOS password | | Bezel lock, power switch lock | |
| **Certifications** | Not available | | OS/2; OS/2 SMP; OS/2 LAN Server; OS/2 Warp Server; NetWare; NetWare SMP; UnixWare; Windows NT; SCO OpenServer; Solaris | | NetWare, Windows NT | |
| **Bundled software** | NetServer Navigator (server management software), Net Server Assistant (setup support) | | IBM Server Guide, PC SystemView (NetFinity) | | NetReport | |
| **Miscellaneous** | 3-year on-site warranty, 24-hour toll-free support available | | 3-year on-site warranty and telephone support 24-hour toll-free support for first 90 days | | 3 year limited warranty, 1 year on-site service, Toll-free technical support | |

**Dell PowerEdge SP 5133-2**

**VENDOR:** *Dell Computer Corp.*
**CONTACT:** *(800) 289-3355*
**PRICE:** *$5,190*
**PERFORMANCE RATING:** *32.3*

PRICE/PERFORMANCE INDEX 161

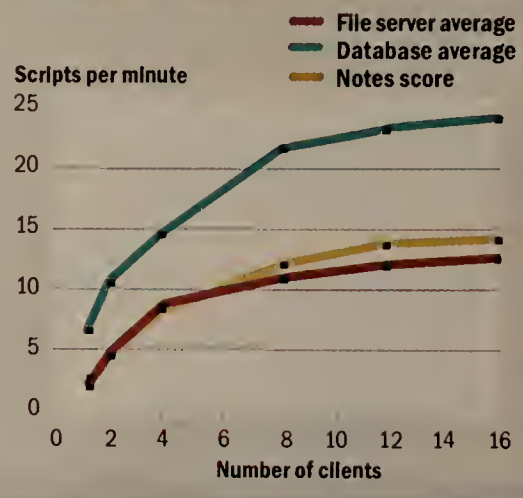
*Note: A lower price/performance index indicates better value.*

We retested a Dell PowerEdge SP 5133-2 with a different configuration than in our original test in the March 18 issue. The new configuration costs about half as much and provides slightly better performance.

The new PowerEdge has a Barracuda ST32550N disk drive, with a faster overall access time than the previous unit, and a 10/100 Ethernet Pro Express network adapter from Intel Corp.

Dell appears to have paid more attention to the software configuration this time, adding patches to NetWare that are available online to fix problems in the released version of NetWare 4.1. The result is a server that holds up better under larger numbers of clients for our database tests, and is speedier at all client levels for file access under both NetWare and Windows NT.

**PERFORMANCE SUMMARY**




NetworkWorld PC WORLD

# SERVER TEST SERIES

**Carthage**

**VENDOR:** *Tangent*
**CONTACT:** *(415) 342-9388*
**PRICE:** *$8,650*
**PERFORMANCE RATING:** *21.2*

PRICE/PERFORMANCE INDEX 407

*Note: A lower price/performance index indicates better value.*

## WORTH NOTING

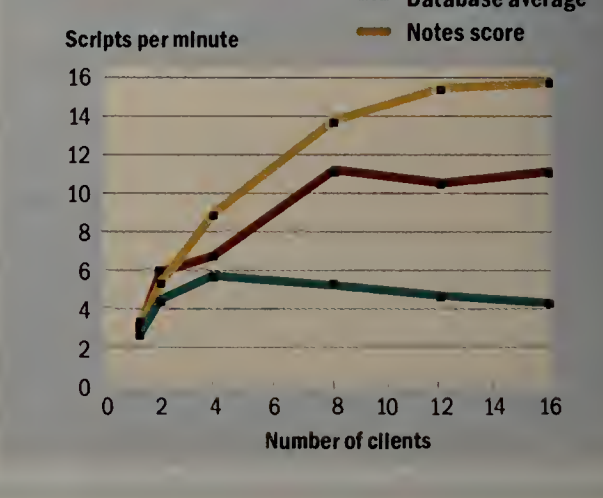
This is a very large server, taking up a lot of floor space. It is the first server we've seen with truly redundant power supplies: Two different power receptacles allow you to put the server on two different circuits. If one of the power sources fails, there's a loud alarm that can be silenced with a button on the back of the unit.

Our unit came with five external bays and six internal bays. The internal bays can be set up for 3 1/2- or 5 1/4-inch drives by removing an insert. Unlocking the front bezel and swinging it open like a door reveals all the drive bays. The two Quantum Corp. Atlas XP34300 drives shipped with our unit are enclosed in a Kensington Microware, Ltd. drive tray that is hot-swappable. The drives are locked into the trays to make them operable. All drives are easily removed from the rails by depressing tabs on the sides of the devices.

The front panel covers three screws that hold the side panel in place. Inside, there's mostly empty space. A baby AT board drives this dual-processor-capable system. There is so much wasted space that the back of the unit even has four cutouts for slots that aren't there. This layout makes all the drives available when the front bezel is open, but it might have been better if Tangent had placed some of the drives internally and made the unit smaller.

On the other hand, all that empty space makes it easy to service this beast. It's the easiest unit we've seen yet for upgrading the SIMMs and processors. The cables are channeled in a reasonable way to keep them out of the way. The three PCI slots were completely filled with the two SCSI controllers and the Cogent Data Technologies, Inc.'s EM400 TX Quartet card. With the video adapter taking up one EISA slot, there are three EISA slots still available for expansion.

**PERFORMANCE SUMMARY**



**NetServer 5/166**

**VENDOR:** *HP*
**CONTACT:** *(415) 857-1501*
**PRICE:** *$29,410*
**PERFORMANCE RATING:** *55.4*

PRICE/PERFORMANCE INDEX 531

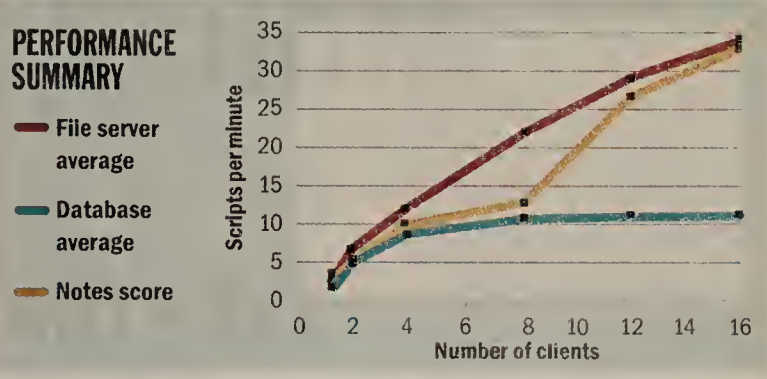
*Note: A lower price/performance index indicates better value.*

drives on both controllers. This was software-based RAID 0. The scalability is good, especially on our database tests.

A bootable CD-ROM includes EISA configuration, HP drivers for various network operating systems, a utility to show the configured cards, a utility to configure the disk array if you have a hardware array, software to configure any software-configurable cards and a utility to create diskettes for any drivers. HP NetServer Assistant, a server manager compliant with OpenView, is also included.

HP's documentation is somewhat sparse. The system comes with a three-year, on-site limited hardware warranty. ■

**PERFORMANCE SUMMARY**




## WORTH NOTING

The HP NetServer 5/166 LS4 is short and squat — the same as the NetServer 5/133 LH we reviewed a few months ago (*NW*, Feb. 19, page 43). The LS4 adds a two-line LCD display on the front panel to provide status messages.

The front is divided: The right side is for storage and the left is for cooling vents and switches/LEDs.

The right side has room for six hot-swappable drives. You pull a plastic protector tab and lift the latch to remove each drive. The drives can be locked in place. We had four of the six bays filled.

Inside, there is not much wasted space. There are lots of slots, but all the PCI slots are occupied by the four 100M bit/sec Ethernet adapters.

There are two integrated Adaptec, Inc. SCSI controllers on the PCI bus, making this a powerful machine. The unit can accept up to four processors — two on each of two cards. The system can also accept up to 768M bytes of main memory.

HP used the four drives and two controllers to give lots of duplexing, which explains the server's excellent performance. Our NT D: drive used all four

# Calling all vendors

**We invite and encourage all vendors of file and application servers to participate in our Server Test Series. For information on how to be included, contact the director of the *Network World/PC World* Server Test Center, Bill Rinko-Gay, at (713) 376-8771 or bill_rinko-gay@pcworld.com.**

# Management Strategies

**Covering:** Career Insights and Innovations in Managing Staff, Budgets and Technology

## Briefs

■ **SoftReach, Inc.** *released* **NetReach 2.0,** *a screen-saver program that enables managers to replace leaping lizards and flying saucers on idle computer screens with awareness and motivational messages.*

*The network-based package includes screen savers for several themes, which are groups of 20 to 30 images containing messages related to a specific topic. It also comes with a theme development kit for creating in-house themes.*

*The core program comes with a single theme and costs $149. Each additional theme sells for $99. The theme development kit costs $149.*

*NetReach: (703) 318-5518.*

■ **Logical Operations** *is planting itself in the computer-based training (CBT) market with the recent purchase of* **Knowledge Quest,** *a Southern Calif.-based CBT development company.*

*Knowledge Quest's Quick Success products provide interactive tutorials that users can access from within certain Microsoft Corp. and Lotus Development Corp. programs.*

*Logical Operations also announced multimedia support for its instructor-led courses and plans to develop CBT courses designed to complement its existing courseware.*

*Logical Operations: (800) 456-4677.*

■ *The* **Syracuse University School of Information Studies** *is offering a* **Master of Science degree in Information Resources Management (IRM)** *that can be earned by taking the majority of courses online.*

*Three required courses introduce students to IRM and cover research techniques and strategic management. Courses chosen from either Management Approaches and Strategies, or User Information Needs or Technological Infrastructures make up the bulk of the program. One elective and an exit project complete the 42-credit program.*

*Syracuse University: (315) 443-2911.*

# Take the career management quiz

*Regardless of your current job satisfaction level, you should be paving your career path.*

**By Frank Schoff**

It sounds overly simple, but the vast majority of workers tend to fall into one of two categories: those who are comfortable with their current jobs and those who are not.

Interestingly, people in either group can often be characterized by the same career-related behavior: inaction. Those who are satisfied with their jobs do nothing because they believe that is OK. Those who are uncomfortable with their current positions likewise do nothing because they don't know what steps to take to remedy the situation.

If you are in either group, here is a quiz that can help you develop a better sense of where your career is and what you could do to get on the road to success.

**Question 1: Do you have a resume that reflects your current job and your most recent significant accomplishments?** *If yes, score 1. If no, but your resume is no more than two years old, score 0. If your resume is more than two years old, score -1.*

It is very risky to be without a current resume. Even if you are not job hunting, the process of updating your resume will prompt you to periodically think about your career progress.

A series of updated resumes will also document your accomplishments. But if your resume is more than two years old and you believe it reflects your current role and most recent accomplishments, you have a more serious problem than an outdated resume.

**Question 2: Do you maintain a career file that has copies of all your resumes, performance appraisals and salary history?** *If yes, and you keep this information at home, score 1. If yes, but it is at work, score 0. If no, score -1.*

A career file is an extraordinary reference resource. You will draw from it when preparing for an interview and when you need to refresh your thoughts on past accomplishments. You will see patterns develop in the work you do, the appraisals you receive and the plans you develop that will provide you with personal insights. And the very process of periodically updating the file will prompt you to think about your career.

If the file is at the office, you will likely not spend the time needed to focus on the information it contains because you'll be dealing with the daily pressures of work. Also, there is the risk that you may get to the office one day to find your key no longer works and you're without the information you will need to start a job search.

**Question 3: Do you have a financial plan or the financial resources to survive six months of unemployment?** *If yes, score 1. If you can survive three to six months, score 0. If you can survive for fewer than three months, score -1.*

Today, career management and financial management go hand-in-hand. You don't necessarily need to have six months of salary in savings, but you certainly should know where that money might come from should you need it. Sources other than savings include unemployment compensation, severance pay and a second family income.

**Question 4: Have you participated in some form of career-related personal development activity outside of work within the past year?** *If yes, and it was initiated and paid for by you, score 2. If yes, but it was initiated by you and paid for by your employer, score 1. If yes, but it was initiated and paid for by your employer, score 0. If no, score -1.*

Managing your career is a continuous process, and you, not your employer, is responsible for it. If you choose to pull off the career management road, the rest of the world will move past you.

The longer you delay, the further you will fall behind.

There is no lack of opportunity to learn more. Pick one of the following subjects: the skills of your craft or profession; the business of your current employer; general business skills; or human behavior. Now go out and continuously learn more about that subject.

**Question 5: Have you read a career-related book in the last year?** *If yes, score 1. If no, score -1.*

You owe it to yourself to visit the library or bookstore and look at the titles that are related to career development. You'll be surprised at the variety of resources. But don't just look. Check one out or buy one, and make sure to read it during some quiet time.

You can certainly set aside the time to read one book a year. The reading will make you think about and focus on your career. And that will hopefully lead to action.

**Question 6: How many employers have you had?** *If two or more, score 1. If one, score -1.*

Having five employers in 20 years makes you more marketable than if you worked for one company over the same time. Diversity of experience in multiple corporate cultures can have greater value than 20 years of loyalty.

**Question 7: In one hour, how many personal network contacts can you write down?** *If more than 100, score 1. If more than 50 but fewer than 100, score 0. If fewer than 50, score -1.*

If you are not consciously maintaining and growing your personal network contacts, you are doing your career a disservice.

This holds true whether or not you are making a job change. The people in your network are valuable resources of information, knowledge, assistance and support. You are the same to them. Support your network and it will support you. Allow that network to languish and so will your career.

**Question 8: Have you had a career review discussion with your current employer?** *If yes, score 1. If no, score 0.*

A healthy relationship with your boss is characterized by the ability to have an open and frank discussion about your career aspirations and whether your current employer can help you meet them.

Consider asking your boss for such a discussion outside the performance/appraisal process. Develop your agenda, and know what you want to discuss. You might be pleasantly surprised at the results.

*Schoff is president of Management Recruiters in Cedar Mountain, N.C., and specializes in the placement of networking professionals. He can be reached at (704) 884-4118 or by fax at (704) 884-3512.*

### Career management quiz scorecard

| Enter score | |
|---|---|
| Question 1 | |
| Question 2 | |
| Question 3 | |
| Question 4 | |
| Question 5 | |
| Question 6 | |
| Question 7 | |
| Question 8 | |
| TOTAL | |

**The maximum score is a 9.**

- If you score between 5 and 9, you are probably managing your career well.
- If you score between 1 and 4, you may want to spend a little more time thinking about career management and developing a strategy.
- If you score in the negative numbers, you could very well be at risk if events outside your control impact your career. You are certainly neglecting your career in terms of fully realizing the potential it has for you.

Whatever your score, each question defines an action item that is under your control. Consider using each of them as a career objective over the next 12 months. A positive return on your efforts is absolutely guaranteed.

**You'll find more detailed explanations of some of the points Schoff makes in the career management quiz on Network World Fusion. Select Careers then Schoff's files.**

**Network World Fusion**
**http://www.nwfusion.com**

## PC SYSTEMS & NETWORK SUPPORT COORDINATOR

**DANA CORPORATION** is a Fortune 500 Company and North America's largest supplier of components for the vehicular market. An immediate opportunity exists in the Victor Products Division Engineering and Technical Center conveniently located just outside Chicago in the Lisle/Naperville, Illinois corridor.

Qualified candidate must have a BS in Computer Science or Business plus 3-5 years of recent "hands on" work in a large multi-scale PC networked environment. Experience in Microsoft Office, Lotus Notes and CC:Mail required with extensive background in TCP/IP, Microsoft network protocols and server administration. Certification in Microsoft NT would be a plus.

If you meet our requirements and have the ability to write technical specifications for systems and work with users communicating at layman levels, we will provide a competitive salary and full range of benefits including group medical and dental insurance, pension plan, 401(k), tuition reimbursement, etc. ***Forward resume complete with salary history/requirements to:***
**Human Resources Director,**
**DANA CORPORATION,**
**Victor Products Division,**
**1945 Ohio Street, Lisle, IL 60532**
**FAX: (708) 271-4802**
***Internet address-***
**HUMAN.RESOURCES@DANAVICTOR.COM**

***Dana Corporation** is an Equal Opportunity/ Affirmative Action Employer. Qualified minorities, female, veterans, and individuals with a disability are encouraged to apply.*

DANA

## Technical Support Engineer

C-C-C, one of the world's leading manufacturers of innovative desktop television and video conferencing systems is currently recruiting technical support personnel in the New York area.

Applicants should have 2-5 years experience in a telecommunications (incorporating voice, video and/or data) or computing background specifically with PC and Unix based applications. Familiar with a variety of LAN and WAN (particularly ISDN & ATM) networks and topologies, you should be able to:

- perform technical site surveys and carry out detailed analysis of client requirements
- conduct product installations at customer sites worldwide, often working to strict deadlines
- provide pre-and post-sales support and develop technical proposals as required
- create end-user and technical documentation and deliver appropriate training
- administer technical account management
- be flexible, work well under pressure responding to a demanding market base and have a strong customer focus

C-C-C offers a comprehensive remuneration and benefits package commensurate with the applicant's experience and track record, and unique career prospects in one of the fastest growing companies in the desktop video industry.

Please apply enclosing your resume to: **Kevin Morrison, President, C-C-C (USA), Inc., 1227 Old Walt Whitman Road, Melville, NY 11747. Tel: 516-547-8888 - Fax: 516-547-5566.**

# cool city
## hot technology


## brought to you by AT&T Wireless Services

AT&T Wireless Services is number one in wireless communications. And, simply put, we intend to stay that way. That explains the formation of our Strategic Technology Group in Seattle. The mandate is to invent the future and to make that future real in the shortest possible time frame. When you're building a state-of-the-art engineering design team -it's important that you track down the best in the world and give them the tools and resources they need.

The work is important, truly leading edge. The resources are impressive..as are the people on our team. And Seattle is fun, affordable, beautiful, prosperous, scenic, upbeat, cosmopolitan - and, most agree, a really cool place to live.

### NETWORK MANAGEMENT SYSTEMS

We're looking for team members with in-depth knowledge of telecommunication or data communication systems with experience in implementing network management systems in a large scale environment in the following areas:

- Telecommunication Management Network (TMN)
- OSI, CMISE/CMIP and TMN Q3 interface
- TCP/IP, LAPB, CLNP, Ethernet and LLC/MAC
- GUI, MOTIF, X-Window and X-Designer
- Object Oriented database development
- C/C++, UNIX
- SUN Solaris 2.x, ToolTalk and Solstice Enterprise Manager
- pSOS, GDMO and DSET Tool Kit

**Network Management Design Engineers**
Bring to our team expertise in NMS applications using ROSE/CMISE, SNMP, Service elements and ASN.1 notation. Experience at low level hardware interfaces of managed entities. Define protocol interfaces between network manager and the managed objects; create network management interface test strategies.

**Network Management Architect**
Expertise in telecom, NMS, OA&M, CMIP/CMISE, OSI, UNIX, Data Communications Networks. Define/design all aspects of telecom NMS; take customer requirements into high level design; involved in the actual implementation phase.

**Network Management Software Engineer**
Design and implementation of network management applications over CMIP/CMISE and OSI. Knowledge of C/C++, Sun Solaris 2.x, ToolTalk, and UNIX. Experience with Sun Solaris EM preferred.

**Network Management GUI Software Engineer**
Expertise in design Graphical User Interface applications in C/C++, with X-Window, MOTIF on UNIX workstation environment; prefer knowledge in X-Designer and telecom.

**Network Management System Agent Design Engineer**
Expertise in NMS applications using ROSE/ASCE and ASN.1 notations. Experience in embedded real-time system with pSOS implementation; design/implement network management agents and managed objects. Knowledge of GDMO, C, CMIP/CMISE, M.3100, and TMN.

**Database Software Engineer**
Design and implement Object Oriented database. Experience in ORACLE, SQL, C++, OOD/OOM, Object Oriented CASE Tools required. Prefer knowledge of telecom NMS.

**NMS Technician**
Knowledge/ability to setup data communication networks and NMS for engineering testing purposes; construct software; ability to setup complex routers, workstations, servers, and a variety of software applications. Will consider Junior/Entry Level Software Engineer, with opportunity for advancement.

### WIRELESS SYSTEM ENGINEERING

**Software Engineers**
Key contributor to the development of state-of-the-art wireless/ telecom systems; embedded multi-processor communications, device drivers, system startup/software downloading, data/radio communications protocols, security mechanisms, call processing applications, and network management and control. Experience should include embedded real-time operating systems, protocol stacks, OO design methodologies, C/C++, 68K assembly, emulators, logic analyzers.

**Software Diagnostics Engineer - Built-In Test Development**
Design Built-In Firmware and Software to diagnose circuits; architect and design test routines using JTAG; serve as principal interface across the design team. Requires strong C programming experience in embedded software development projects; experience with microprocessor based systems; ability to design diagnostics and work with concepts such as JTAG, BDM, etc; experience in DFM/DFT; BSCS/EE or equivalent.

**Software Quality Assurance**
Define, establish and implement the Software Quality Assurance process in our organization. Our goal is a process which monitors SW activities to assure compliance with requirements, tracks defect types and identifies process improvement opportunities. Establish and implement the SW Configuration Management process. Requires experience in the following: team facilitator; QA practices; knowledge of Configuration Management, requirements traceability, and SEI; both embedded and application software; defect tracking and analysis; able to work directly with engineers; able to define SQ metrics; process/procedure oriented; C,C++, Object Oriented technology; new product development and design; excellent communicator.

**PLEASE SEND, FAX OR E-MAIL YOUR RESUME* TO:** AT&T Wireless Services, Strategic Technology Development, 14520 NE 87th St., Redmond, WA 98052. Fax:(206)702-2960. E-mail: stg.jobs@attws.com For more information on AT&T Wireless Services please visit our homepage at: http://www.attwired.com

- For scanning purposes, please send resume in Arial or Helvetica font (point size 10 or 12) without italics, bolding, graphics, bullets, asterisks or / marks to separate words, on plain white bond paper.

AT&T

Equal Opportunity Employer

# HIGH-TECH & DIVERSITY CAREER CONVENTIONS™

**The NAACP invites professionals with three or more years experience from ALL communities to its job fairs on:**

## TUESDAY, JUNE 4, 1996

**NAVY PIER • 600 EAST GRAND AVENUE • CHICAGO, IL**

**EXHIBITORS INCLUDE:**

American Family Mutual • American General Finance • Avco • Denny's • Dupont Merck Pharmaceutical Co. • Eddie Bauer • EDS • First of American Bank • GE Capital Auto Financial Services • Hewitt • Humana • IBM • Katten Munchin & Zavis • LEXIS-NEXIS • Lockheed Martin • Manor Care • Matsushita • MetLife • Motorola AECG/AIEG • Northwest Airlines • Office Depot • OfficeMax • Periggo • Prudential • Recon Optical • SEI Information Technology • Service Master • Target Stores • United Parcel Service • US Robotics • Vanstar • Zenith Electronics

## MONDAY, JUNE 17, 1996

**MCLEAN HILTON • 7920 JONES BRANCH DRIVE • TYSONS CORNER, VA**

**EXHIBITORS INCLUDE:**

AAI Corporation • Andersen Consulting • Arlington County • BBN Corporation • Booz Allen & Hamilton • Capital One • Chevy Case Bank • Central Intelligence Agency • Citibank • Computer Data Systems • Denny's • Dupont Merck Pharmaceutical Co. • EDS • Fairfax County • GTE Government • IBM • LEXIS-NEXIS • Lockheed Martin • Manor Care • MCI Telecommunications • MetLife • Montgomery Co. Police Dept. • NASD Regulation • NYNEX Information Resources • Perspective Technology • PHP Healthcare • Pitney Bowes • PRC • Price Waterhouse • SCT • Service Master • The Southland Corporation • Sprint • Taco Bell • Texas Instruments • TRW • US Healthcare

## FRIDAY, JUNE 21, 1996

**68TH STREET ARMORY • 68 LEXINGTON AVENUE • NEW YORK, NY**

**EXHIBITORS INCLUDE:**

Allied Signal • Dime Savings Bank of New York • ESPN • GlaxcoWellcome • IBM • LEXIS-NEXIS • Matsushita • MetLife • MFS Communications • Microsoft • Moody's Investors Service • New York Life • NorTel • Office Depot • Reuben H. Donnelley • Sprint • Taco Bell • US Healthcare • Vanstar

We are not an employment agency. No registration required. All companies are Equal Opportunity Employers.

**Show Hours for all three Events are 11:30am - 6:00pm, with Free Admission and Free Career Seminars.**

**FOR MORE INFORMATION, CALL 1-800-JOB-SHOW**

Event Monogement by

SILVEX

2601 Ocean Park Boulevard, Suite 320 • Santa Monica, CA 90405
(310) 450-8831 • Fax: (310) 396-3157 • http://www.nooopjobfair.com

---

Mark your calendars for these important trade show/bonus distribution opportunities coming soon.

| Issue | Trade Show/Buyers Guide | Ad Close |
|---|---|---|
| 6/10 | *IntraNet Magazine* Debut | May 29 |
| 6/17 | PC Expo, New York, Frame Relay Buyer's Guide | June 5 |
| 6/24 | Supercomm/ICA Expo, Dallas | June 12 |

For more information or to place an advertisement, please call Pam Valentinas at 1-800-622-1108.

---

## NETWORK ANALYST

(Telecommunications)

There's a stretch of Florida's Atlantic Coast that is by far its loveliest, and it's here that you'll find Martin Memorial Health Systems, a 336-bed multi-facility healthcare organization utilizing the latest technologies. Our growing organization relies on sophisticated telecommunications capabilities and is currently seeking a Network Analyst to provide technical support for our Wide Area Network, including data, voice and video. Responsibilities include analysis of additions and improvements to the enterprise network, as well as installation and troubleshooting.

To qualify, you'll need a minimum of 3 years in network telecommunications, extensive knowledge and experience with network protocols such as Ethernet, FDDI, ISDN and TCP/IP. Telecommunications experience with Meditech computer system and AT&T phone system helpful.

In return for your expertise, we'll reward you with excellent compensation (no state income tax!), full-featured benefits, and an ideal seaside location just 30 miles north of Palm Beach. For consideration, please send resume with salary history and requirements to: Martin Memorial Medical Center, Human Resources, P.O. Box 9010, Stuart, FL 34995. FAX: (407) 223-6886. Or you may email to martin@mi.hodes.com. EOE, drug/smoke free work environment.

**Martin Memorial Health Systems, Inc.**

---

FOR MORE INFORMATION ON ADVERTISING IN NETWORKING CAREERS
CONTACT PAM VALENTINAS
1-800-622-1108

---

Software Consultant: Provide services to clients in design & development of business applications; develop invoicing & order processing modules to support sales information, allocations, order tracking, pickslip generation & inventory databases, using Progress, REXX, C, SCO Unix, LAN Workplace tools (FTP, Rapid Filer, Host Presenter), Novell Netware, Oracle & DOS; develop interfaces to reduce application development time; develop backup & restore scripts; create user segments & indexes for faster query time; develop maintenance programs for screen functions; provide technical support to users. $36,000/yr. 40 hrs/wk. Mon-Fri. B.S. or equivalent in Computer Sc. or Computer Eng. & 2 yrs. exp. in job offered or 2 yrs. related exp. as Software Engineer, Systems Analyst, Instrumentation Engineer, Research Assistant (combination of listed positions totaling 2 yrs. is acceptable). Exp. in related occupations must include use of Progress, REXX, C, SCO Unix, LAN Workplace tools (FTP, Rapid Filer, Host Presenter), Novell Netware, Oracle & DOS. Apply at the Texas Employment Commission, Dallas, Texas or send resume to Texas Employment Security, 1117 Trinity, RM 424T, Austin, TX 78701. J.O.#TX7505197. Ad Paid by an Equal Opportunity Employer.

---

## MANAGER, NETWORK SERVICES

**$50,976-$81,036 Annually**

## CHIEF, NETWORK OPERATIONS

**$42,996-$68,472 Annually**

**The County of Orange** seeks dynamic network managers to fill two critical positions in the Network Services Division. The Manager, Network Services, and the Chief, Network Operations, plan, organize and direct the design, selection, installation and maintenance of the County networking infrastructure. Manager candidates must possess a minimum of 7 years of progressive responsibility in systems project administration and management. Chief candidates must have the ability to effectively supervise/coordinate the activities of the Network Services Section. Both positions require experience which demonstrates thorough knowledge of principles and practices of network operations, voice, data, microwave, LAN and WAN technologies. Significant experience at the management level and extensive industry experience as it relates to current telecommunications technologies desired.

These recruitments close Friday, June 21, 1996. Resumes cannot be accepted in lieu of the required application packet. Contact **Marguerite Adams** at (714) 834-5262 or **Central Human Resources** at (714) 834-2844 for mailed application materials or apply in person to: **Human Resources Dept., Hall of Administration, 10 Civic Center Plaza, Santa Ana, CA 92701.** Information about other employment opportunities with the County of Orange is available on the Internet at **http://www.oc.ca.gov/hr.** Principals only may apply.

**County of Orange**

Equal Opportunity Employer

---

Software Consultant: Provide services to clients in design & development of business applications; implement problem solving system for worldwide networks support; develop specifications & screen prototypes on Unix & Sybase System 10, maintaining system under Unix with Sybase RDBMS on a Sun SparcCenter 2000; generate reports in SQR; document CLARIFY 190 SQR programs with C++, C shell scripts & Crontab in Unix, support system integration, analyze on-line modules, design & develop on-line screens, test, modify & provide technical support to users. $45,000/yr. 40 hrs/wk. B.S. or equivalent in Computer Sc. or Computer Eng. or Math & 2 yrs. exp. in job offered or 2 yrs. related exp. as Systems-Analyst or Programmer-Analyst. Exp. in related occupations must include use of Unix, Sybase System 10, Sybase RDBMS, SUN SparcCenter 2000, SQR, CLARIFY 190, C++, C shell scripts & Crontab. Job Location: Chattanooga. May work at unanticipated locations in the U.S. Submit resume to Charles Turner, Dept. of Employment Security, P.O. Box 11088, 311 MLK Blvd., Chattanooga, TN 37401 ATTN: J.O. #TN6200203.

---

Office Manager (Software Development): Manage development & marketing activities relating to design, & development of software products such as AS/400 & RISC 6000 applications; plan, develop & establish company policies & objectives; identify new market avenues; interview & hire technical staff; coordinate software projects in the U.S. locations relating to use of AS/400, RISC 6000, Unix, Oracle, Ingres, C++, DB2, MS-Windows, PowerBuilder, GUIs, CICS & many other software platforms; handle advertisement & recruitment campaigns, oversee budget activities, & personnel changes; responsible for administration, finances, project estimation, & contract activities at company locations in TN, GA & NJ. $40,000/yr. B.S. or equivalent in Business Admin. or Marketing & 2 yrs. exp. in job offered or as Project Manager or Managing Director in software development environment. Exp. in related occupations must include directing software development projects & use of AS/400, RISC 6000, Unix, Oracle, Ingres, C++, DB2, MS-Windows, PowerBuilder, GUIs & CICS. Travel req'd approx. total of 5 days/mo. to GA & NJ, & 4 wks/yr. to India. Job Location: Chattanooga. Submit resume to Charles Turner, Dept. of Employment Security, P.O. Box 11088, 311 MLK Blvd., Chattanooga, TN 37401 ATTN: J.O. #TN6200208.

---

## SOUND OPPORTUNITIES

*to achieve success*

Across all industries, TRECOM Business Systems is enabling change through high-impact consulting, systems integration and outsourcing services. As demand for our technical expertise continues to grow, we're creating solid opportunities for you to succeed.

- **ISDN BUSINESS ANALYSTS**
- **CNE - ECNE**
- **LAN/WAN PROFESSIONALS**
- **NT ADMINISTRATORS**
- **WORKSTATION SPECIALIST**
- **LAN ADMINISTRATORS**
- **NeXT LAN/WAN SPECIALIST**

Consult with confidence, backed by a competitive salary, a 401(k) plan, relocation assistance, and other progressive benefits. Start by sending your resume to: **Director of Recruiting, TRECOM Business Systems Inc., Dept. NW513, 8521 Leesburg Pike, Suite 405, Vienna, VA 22182; Fax (703) 883-2019; Phone (703) 883-2012; Email: info@trecomdc.com** EOE/AA.

**TRECOM**
**Business Systems Inc.**

AL • CT • FL • GA • NJ • NY • TX • Washington, D.C.

---

**Your Ad Could Be Here For $560.00**

# Marketplace

The Hub of the Network Buy

## Free Product Information

To receive more information circle the reader service numbers of products that interest you.

Send this coupon to: Network World P.O. Box 5090, Pittsfield, MA 01203 or Fax (413) 637-4343, or use the prepaid card elsewhere in the issue.

*Expires 8/26/96*

**Name:** _____

**Title:** _____

**Company:** _____

**Phone: (  )** _____

**Street:** _____

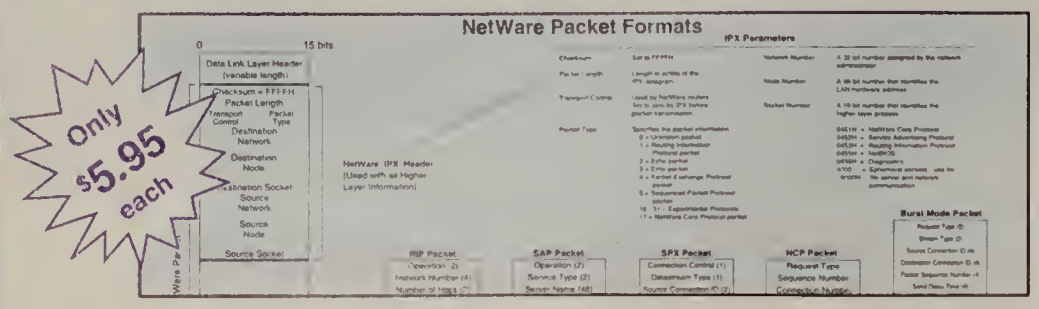
**City:** _____

**State:** _____ **Zip:** _____

| | | | | | | |
|---|---|---|---|---|---|---|
| 217 | 218 | 219 | 220 | 221 | 222 | 223 |
| 224 | 225 | 226 | 227 | 228 | 229 | 230 |
| 231 | 232 | 233 | 234 | 235 | 236 | 237 |
| 238 | 239 | 240 | 241 | 242 | 243 | 244 |
| 245 | 246 | 247 | 248 | 249 | 250 | 251 |
| 252 | 253 | 254 | 255 | 256 | 257 | 258 |
| 259 | 260 | 261 | 262 | 263 | 264 | 265 |
| 266 | 267 | 268 | 269 | 270 | 271 | 272 |
| 273 | 274 | 275 | 276 | 277 | 278 | 279 |
| 280 | 281 | 282 | 283 | 284 | 285 | 286 |
| 287 | 288 | 289 | 290 | 291 | 292 | 293 |
| 294 | 295 | 296 | 297 | 298 | 299 | 300 |
| 301 | 302 | 303 | 304 | 305 | 306 | 307 |

*5/27/96*

# Protocol Reference Guides




Save valuable time troubleshooting your internetwork with these Reference Guides. Each laminated guide is 8 $^{1}/_{2}$" x 11", double-sided, and available for only $5.95 each, plus shipping. The following titles are available:

| LANs | Architectures | WANs | Net Mgt | Internets |
|---|---|---|---|---|
| • Ethernet/802.3 | • AppleTalk | • ATM | • SNMPv1 | • TCP/IP |
| • FDDI | • Banyan VINES | • Frame Relay | • SNMPv2 | • IPv6 (IPng) |
| • Token Ring/802.5 | • DECnet Ph IV | • ISDN | • RMON | • OSPF |
| • LAN Cabling | • GOSIP v2 | • SMDS | • RMON2 | • ISO IS-IS |
| • Physical Layer | • Novell Netware | • SONET | • WAN MIBs | • ISO ES-IS |
| • Data Comm | • The Internet | • X.25 | • UNIX | • ISO TP/CLNP |

*Call Us for More Information and a Free Catalog*

**Hollister Associates • P.O. Box 575 • Lyons, CO 80540**
**Tel: (303) 682-2634 Fax: (303) 682-2654**
**Email: hollister@csn.net**

All trademarks are the sole property of their respective companies.

Reader Service No. 270

# Distributed SNMP Management for the Enterprise Series

Find out how the leading NMS vendors' latest systems do it...and how they compare!

**Volume I:**
**Distributed Network Management, Strategic Planning and Design**

Philosophies of Management
Architectural Comparisons
(Cabletron, HP, IBM and Sun)
Traffic Implications
Scalability
Cost Implications
APIs for Customization
Practical Q & A

***Plus, understand the options for distributed "viewing" of your network.***

**Volume II:**
**Comparing Leading Distributed SNMP Managers**

Side-by-Side Lab Test Results
of leading SNMP Managers
New Features in Latest Releases
Configuration Pricing
Third-Party Applications and
Extra-Priced Options
Competitive Assessment
Market Share Analysis

***Volumes available separately or in a special-priced combo.***

***For more information call 1-800-MIERCOM***

MIER Communications, Inc.
99 Hightstown Road, Princeton Junction, NJ 08550
Phone: 609-275-7311 ☎ Fax: 609-275-8813
***http://www.mier.com***

Reader Service No. 288

# INTERNET

## SERVICE PROVIDERS AND CORPORATE USERS

***Is Bandwidth Availability Affecting Your Business? Are Your Capital Expenditures too High?***

**Paragon Networks' INTERNETworking Access Manager provides:**

- Lowest cost solution for high speed Internet access
- Integration of multiple network services at a single access point
- Multiple functionality - eliminating the need for added capital expense
- World's smallest solution for domestic and international markets

The INTERNETworking Access Manager is PNI's newest addition to its Series 8500 family of integrated access products. It enables provisioning, access to, and support of multiple internetworking services which use today's existing facilities, eliminating the need for added capital expenditures.

For more information about the INTERNETworking Access Manager or any of PNI's products, contact Peter Meroni, Product Marketing Manager, at **1-800-8500-PNI or Marketing@paragon-networks.com.**

**Paragon Networks International Inc.**
**800 Main Street South, Suite 210**
**Southbury, CT 06488**

Reader Service No. 304

# WIRE-SPEED 10 TO 155 MBPS

Freespace™
FreespaceTurbo™
FreespaceLite™

BEST LAN TIMES 1995

WINNER Beta Communications LAN Times BEST OF SHOW 1995 INTERNET ATLANTA

The award-winning Freespace laser link delivers wire-speed building-to-building connectivity at distances up to 1000ft. (300 meters). Cost-effective and easily installed, Freespace bridges the gap when traditional solutions like fiber are unavailable – and T-1 lines just aren't fast enough.

The Freespace family includes:

- Freespace Turbo for ATM, FDDI, and Fast Ethernet connections.
- FreespaceLite for an economical Ethernet link.
- A multiplexed Freespace solution integrating Ethernet with up to 4 T-1 voice lines.

Designed for all weather conditions, Freespace is your interbuilding solution for short-range, wire-speed connectivity.

Call us, fax us, or visit us at http://www.silcomtech.com

SILCOM

Freespace, Freespace Turbo and FreespaceLite are trademarked names of SilCom Manufacturing Technology Inc.

**North America 1-800-388-3807**
**Tel: (905) 238-8822 Fax: (905) 238-4976**

Reader Service No. 269

# Fast Ethernet From Intel and West Hills


## Completing The Fast Ethernet WorkGroup

### Intel Introduces Switching Hub, Extending Fast Ethernet Leadership

Get the fastest total system performance for clients and servers over 10 and 100 Mbps Ethernet LANs. The Express Switching Hub increases the bandwidth of Fast Ethernet installations by dividing the network into segments. The Express Switching Hub is a Fast Ethernet store-and-forward switch with five 100Base-TX ports and two optional high-speed 100Base-TX/FX expansion ports. The Switching Hub provides Virtual LAN, supports Virtual Broadcast and Virtual Security domains.

The Express Stackable Hub combines the high performance of modular hubs with the low-cost and flexibility of stackable hubs.


The Express Hub has 12 100Base-TX ports and stackable up to six units, providing 72 ports in a single collision domain.

Intel EtherExpress PRO/100 Adapters and PRO/100 Smart Adapters extend the power of Pentium processor-based high-powered desktop systems and servers right onto the LAN. With a high performance 32-bit architecture for fast throughput and the industry's lowest CPU utilization, PRO/100 Adapters unplug all your network bottlenecks.

| | |
|---|---|
| **Switching Hub (ES100TX)** | **$ 3,690.00** |
| **Stackable Hub (EC100TX)** | **$ 1,485.00** |
| **PRO/100 Adapter (PILA8465B) Single** | **$ 132.00** |
| **PRO/100 Adapter (PILA8465B) 5-Pack** | **$ 580.00** |
| **PRO/100 Adapter (PILA8465B) 20-Pack** | **$2,195.00** |
| **PRO/100 Smart Adapter (PILA8485)** | **$ 705.00** |

intel®



## Intel and West Hills -- the leaders in Fast Ethernet

**North American Office**
7949 Woodley Avenue, Van Nuys, CA 91406
818/773-8171 •Fax 818/773-8932

**WEST HILLS LAN SYSTEMS**
**800-FOR-LANS**
**800-367-5267**

**European Office**
Yokneam Industrial Park, P.O. Box 1280 Yokneam 20692, ISRAEL
972-4-993-6264 • Fax 972-4-993-6230

**Visa & MasterCard • Fast Delivery • Most Orders Ship The Same Day • Prices Subject To Change Without Notice**

**Reader Service No. 253**

# Finish Out Your Rack with a Magnum Commander

- Control up to 96 file servers with 1 keyboard, monitor and mouse
- AutoBoot™ feature boots all computers without user intervention
- 3.5" unit is designed for 19, 23, and 24" rack applications
- Each unit controls up to 16 file servers; cascade up to 6 units
- Push-button and keyboard controlled scanning standard
- Supports all 100% IBM compatible PCs and PS/2 or serial mice; integral Sun and optional Mac support available
- Control all attached computers locally, remotely, or both; rear peripheral access available


MAGNUM
COMMANDER™

Cybex Computer Products Corporation
4912 Research Drive
Huntsville AL 35805 USA
1-800-932-9239 (205) 430-4030 fax
http://www.cybex.com

CYBEX™
COMPUTER PRODUCTS CORPORATION

IBM, PC, and PS/2 are registered trademarks of International Business Machines Corporation. Macintosh is a registered trademark of Apple Computer, Inc. Sun is a trademark of Sun Microsystems. Cybex, Commander, and AutoBoot are trademarks of Cybex Computer Products Corporation.
**Dealer Program Available** **Made In the USA**

Reader Service No. 227

# What do you do with your Eastern Research DDS CSU/DSU when you upgrade to T-1?


## Nothing!

*Well, almost nothing. You do have to push a button and move a cable. The Eastern Research netAxxess 9000 is the only CSU/DSU on the market to include both 56/64 Kbps DDS and T-1 interfaces. Only one unit to buy and only one unit to install, maintain and spare.*

*The SNMP-managed netAxxess 9000 is a fully-featured, super rate CSU/DSU. It is supplied complete with a V.35/RS232/RS530 interface, V.54 and ESF diagnostics with auto dial-out on alarm, a front panel LCD display, a built in BERT and two supervisory ports - one SNMP/SLIP and one ASCII.*

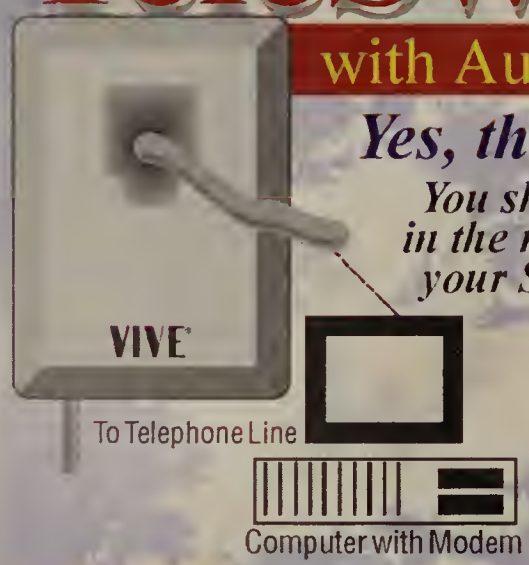
*The Eastern Research product line includes multiprotocol routers, multiplexers and an SNMP Network Management System with a graphical user interface. For more information on the netAxxess 9000 and on other unique Eastern Research products, call 800-337-4374 or write Eastern Research, 225 Executive Drive, Moorestown, NJ, 08057.*

Eastern Research
Products as Solutions
http://www.erinc.com

Reader Service No. 225

# TeleSwitch II

## with AutoReboot function




## *Yes, there's a better way!*

*You shouldn't have to be awaken in the middle of the night because your Server application for some unknown reasons decides to quit running*

## *Proven Performance,*

*highly recommended by industry specialists*

**TeleSwitch II** **US$169**

*Automatically reboots your computer system when it hangs or accepts commands by DTMF tones from remote telephone to turn on/off an electrical equipment for certain duration*

**Automatic Reboot function:**
- monitors a character sent periodically from the Server/PC for continuity. When continuity is broken it will cause the Server/PC to do a cold boot
- simple to install and easy to use

**Remote Switching function:**
- Password Protected remote access
- DIP Switch selection for various modes of operation
- works with pulse dialling telephone as well as tone phones
- European versions available
- handles up to 3 Amp peak rating, 10 Amp resistive.

**TeleSwitch** **US$129**

*for switching on/off electrical equipment by tone commands from remote telephone*

VIVE® Synergies Inc.

**Tel: (905) 882-6107 Ext. 16, 25, 26 or 20**

For Product & Company Information:
1-800-567-4954
Fax-on-Demand: Tel. 905-882-6107 press 5
Internet: http://WWW.VIVE.COM/

30 West Beaver Creek Rd., Unit 101, Richmond Hill, Ont. Canada L4B 3K1 FAX: (905) 882-6238

Reader Service No. 261

# For creating Java™ applications, WebGalaxy™ is like an espresso machine on steroids.


**WebGalaxy™ generates complex Internet/Intranet Web Server business applications automatically from a graphical development environment. That's right, Java™ applications instantly! All you have to do is *add knowledge...and serve.* For more information on WebGalaxy™, visit the real thing: http://www.webgalaxy.net/nw. or call 1.800.475.7171**

http://www.webgalaxy.net/nw

Web Rapid Application Development

The application of knowledge™



Reader Service No. 229

# FDDIMeter 3600 RMON LAN Monitor

## Special Offer $6,995

### Product Description

Technically Elite's FDDIMeter 3600 is a powerful, high-performance FDDI/CDDI monitoring probe for proactive network monitoring that collects valuable statistics and trend data on any FDDI ring or concentrator.

### Out-of-Band Over Another LAN

The FDDIMeter opens the door to RMON monitoring from alternate network sources (i.e., Ethernet or Token Ring). One port monitors the FDDI network in a listen-only mode, and the other interface reports statistics via Ethernet or Token Ring. In this configuration, The FDDIMeter is monitoring both the FDDI and the management network concurrently. This eliminates any problems that may arise from loading the FDDI ring with extra SNMP management traffic, a unique feature of the FDDIMeter. Fully supports RFCs 1757 and 1513, the RMON Standard for Remote Monitoring.

### Features

- High-performance RISC processor
- Additional Ethernet or Token Ring reporting port available
- SAS or DAS support
- Fiber or copper support
- SC-Type to MIC Duplex cable converter available

### Supported Management Platforms

- IBM NetView
- HP OpenView
- SunNet Manager on Sun Solaris or SunOS
- DEC UNIX POLYCENTER NetView
- Cabletron SPECTRUM
- Applications also run standalone

Integrates with MeterWare for Windows and Windows 95/NT; six UNIX platforms supported

**90-Day Introductory Offer**

**1.800.474.7888**

http://www.tecelite.com e-mail: sales@tecelite.com

Recommended list $8,495 for a single attached station unit with 9MB of memory. Offer expires July 1, 1996. All trademarks and trade names are the property of their respective holders.

Technically Elite
monitoring your enterprise

Reader Service No. 247

---

*Prices drastically reduced!*

Weitek Giant Mark-down

## Weitek SPARC™ POWER uP Chip.


## Only $595

## SPARCstation™ 10 Performance

*Buy now and save $200 (quantity discounts available)*

*Weitek's 80MHz SPARC POWER™ uP Chip: 100% compatible with all versions of Solaris®, easy to install, SunService warranty, twice your existing SPARCstation processing power.*

*Easy to Install • Upgrades • Trade-ins*
*Buy now from Rave and save.*

*Rave Computer is the exclusive worldwide distributor of the Weitek SPARC POWER uP Chip*

SPARCstation™ 2, IPX®
Weitek Performance Upgrade...

### *Rave Computer Association, Inc.*

*36960 Metro Court • Sterling Heights, MI 48312*
*Fax: (810) 939-7431 • E-Mail: info@rave.com*
*Internet: http://www.rave.net*

RIDE THE WAVE — RAVE COMPUTER ASSOCIATION, INC. — SAVE WITH RAVE

**1-800-966-7283**

WEITEK

Reader Service No. 302

---

*AVALAN Introduces...*

# Remote Control for NT!

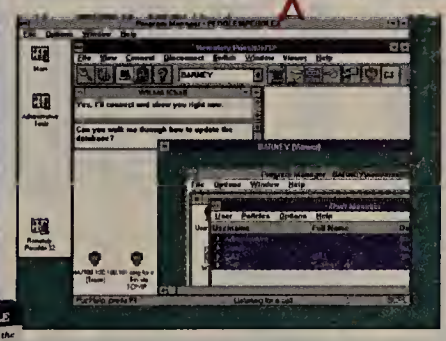
WINDOWS REMOTE CONTROL

## REMOTELY POSSIBLE/32-NT

Works over the INTERNET!

## Be in Two Places at Once! or More!

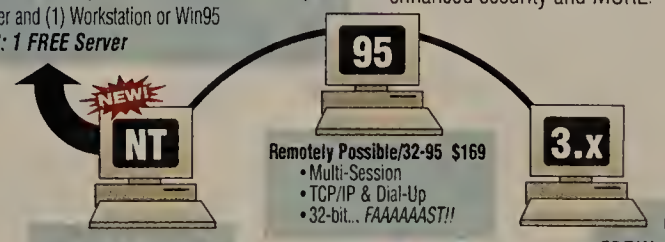
Designed for Microsoft® Windows®95 & Windows®NT




- **Control NT Workstation and NT Server** from either Windows 95 or NT platforms
- **Multi-Tasking Allows Simultaneous Remote Control, File Transfer, Keyboard Chat & "Passive Monitoring"** for Offsite to Office, Help Desk, Training, Customer Support & Network Management
- **Fast Performance** over Winsock TCP/IP & IPX on LANs, WANs or via PPP, SLIP & RAS
- **Multi-Tasking** lets you take over multiple PCs simultaneously
- **New Features** – drag 'n' drop, long filename, logging, Host call-out, data encryption, enhanced security and MORE!

**Remotely Possible/32-NT** Starter Packs
**Workstation Pack RP/32-NT–SA1F ....$199**
(2) Workstations or Win95
***BONUS: 1 FREE Workstation***
**Server Pack RP/32-NT–DA2F .....$399**
(1) Server and (1) Workstation or Win95
***BONUS: 1 FREE Server***

*"Remotely Possible/32 breezed so easily through our test document without screen-refresh delays that we had to remind ourselves we were connected remotely"*
*—PCWeek*
*Feb. 12, 1996*


**Remotely Possible/32-NT**
• Take over NT Workstation or NT Server

**Remotely Possible/32-95 $169**
• Multi-Session
• TCP/IP & Dial-Up
• 32-bit... *FAAAAAST!!*

Visit Our Home Page at http://www.AVALAN.com

Choose from

| | |
|---|---|
| RP/DIAL | $169 |
| RP/Sockets | $169 |
| RP/LAN | $599/site |

**Call TODAY to Place Your Order!**
**Bonus Offer Ends May 31, 1996**

AVALAN TECHNOLOGY

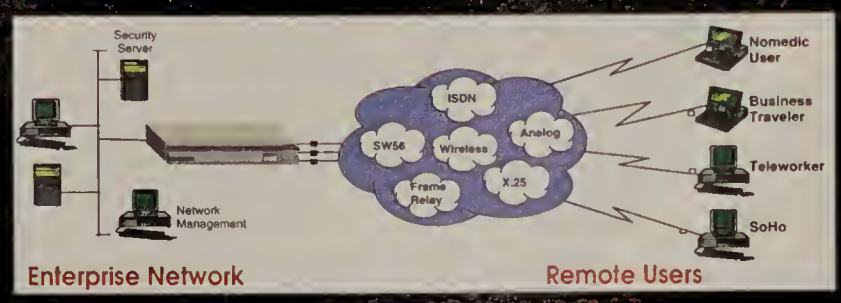
**1-800-441-2281**

P.O. Box 6888, Holliston, MA 01746 • HTTP://WWW.AVALAN.COM (508) 429-6482 • FAX (508) 429-3179 • e-mail AVALAN@AVALAN.COM

Reader Service No. 276

# Remote Access

## AccessBuilder 2000 • 4000




- Token Ring and Ethernet models
- Simultaneous Analog and ISDN on one platform
- Dynamic bandwidth to reduce dial-up charges
- Multiprotocol bridging and routing
- Management for IP and IPX
- Advanced security

Demos Available!

*MAXNET Offers Expert Network Services:*

- Network Baseline and Analysis
- Vendor-Independent Network Design
- 24 x 7 Help Desk, Multivendor Maintenance
- Remote Network Monitoring, Management

Call 1-800-4-MAXNET

MAXNET™ communication systems, inc.

www.4maxnet.com

3Com net Working Partners *Advanced Solutions Partner*



Reader Service No. 267

# DI3270 MultiProtocol Workstation


A Host of Connectivity Options

A cost-effective, high-performance 3270 terminal emulator featuring a powerful HLLAPI and IND$FILE, and DOS and Windows versions. Volume pricing and free evals are available.

DATA INTERFACE SYSTEMS CORPORATION

☎ 512-346-5641
✆ 512-346-4035
800-351-4244

Reader Service No. 238

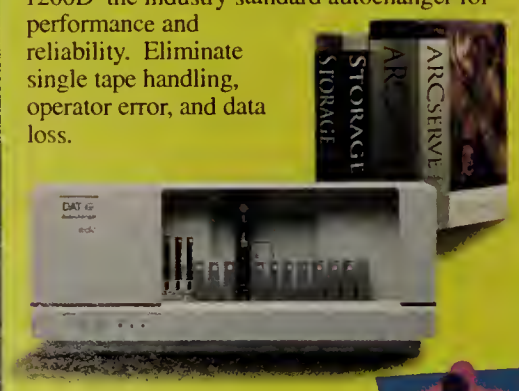
**FREE Product Info**

**Remember to fill out your Reader Service Card in this issue!**

# add it UP!

Save your data and thousands of dollars

**ADIC 1200D DAT Autochanger**
Automate your backup with the ADIC 1200D–the industry standard autochanger for performance and reliability. Eliminate single tape handling, operator error, and data loss.



adic DAT Autochanger 1200D

CHEYENNE ARCserve PLUS with Changer Option 6.0 Upgrade

$4,995

Get ADIC's field proven robotics, your choice of 4mm DDS-2 drive (Sony or HP), and a 12-cartridge magazine that holds 96GB of data. Access to any file on any cartridge in about 40 seconds.
*Lists separately for $6,995*

**Cheyenne ARCserve 6.0 for NetWare with Changer Option**
Upgrade your ARCserve® for NetWare® 4.x or 5.x package with all the new 6.0 features–and we include the Cheyenne Changer Option.

Fully automate your backup now with centralized job management, full NDS compliant support, and an easy-to-use Windows interface. New features include automated media tracking, tape rotation, pre-scheduled drive cleaning, and user file restore. *List together for $995*

**Offer exclusively for current ARCserve customers. Offer good from February 1, 1996 to May 31, 1996.**

1-800-336-1233

adic

E-mail: info@adic.com
Web: http://www.adic.com

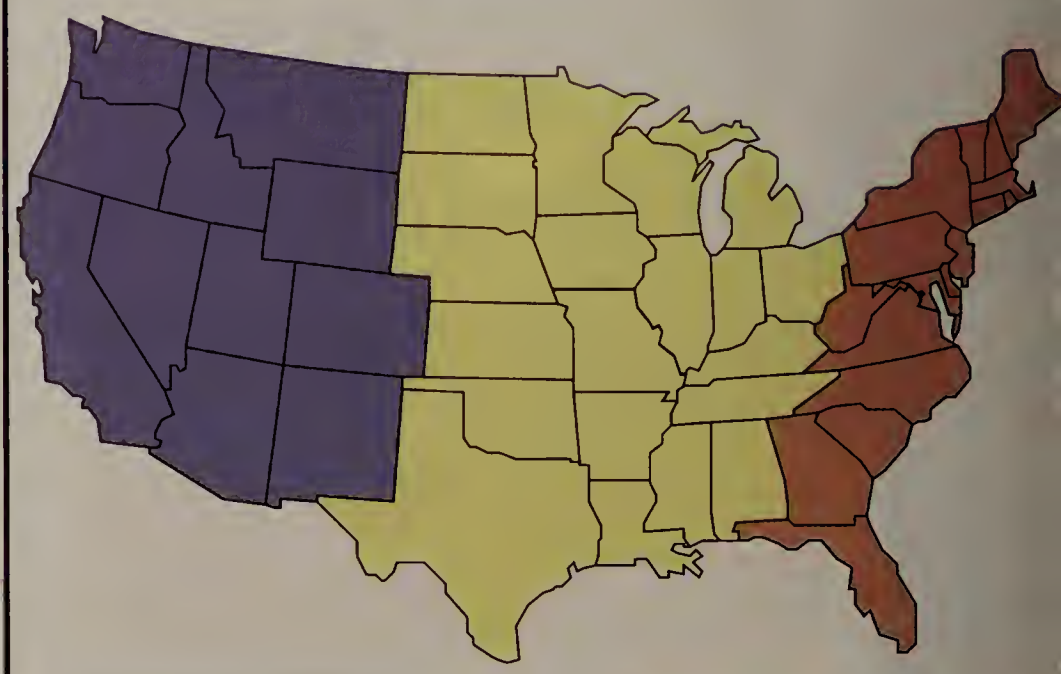


Reader Service No. 246

# DIRECT RESPONSE ADVERTISING

## Sales Territory Map

*Response Card Decks • Formatted Marketplace • WebWares*



**West**
**Clare O'Brien**

**East**
**Richard Black**

**Central**
**Heather Fairbanks**

**508-875-6400 or 800-622-1108**

All column inch marketplace ads are handled by Carla Cappucci.

# 100 Mbps Fast Ethernet and Ethernet Switches

## Special Promotional Bundle

**Intel WorkGroup Solution**

One Intel Switching Hub (ES100TX)
Three Intel Twelve-Port Stackable Hub (EC100TX)
Thirty Intel 10/100 32-Bit PCI Adapters (PILA8465B)
**Total Cost for Bundle** .....**$9,795** (Expires 6/30/96)

## 10/100 Ethernet Switches

### INTEL

Express Switching Hub, Five Switched 100Base-TX Ports (ES100TX) .....**$3,690**

### BAY NETWORKS

**Bay Network Lattis Switch System**
**Fast Ethernet Switching Hubs**

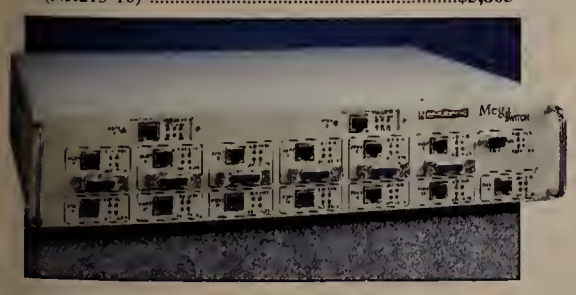
10/100 Mbps UTP Switch,16 RJ45 Supports 10/100 Mbps Ethernet, Mode (28115) .....**$12,360**

100Mbps *Fiber Optic* Switching Hub (28104) .....**$14,950**

### NBASE

MegaSwitch FO
Five 100Base-FX Ports (NH2007FO).....**$6,455**
New MegaSwitch, Five 100Base-TX Ports, Plus Two Expansion Slots for 100Base-TX/FX (NH2007).....**$4,450**

MegaSwitch Six AUI/RJ45 Ports, Pre-Configured with One 100Base-TX Port NH200MP, and SNMP (NH208-10) .....**$3,695**
MegaSwitch Six AUI/RJ45, Plus Seven RJ45 Ports, Pre-Configured with One 100Base-TX Port NH200MP, and SNMP (NH215-10) .....**$5,863**



100 Base-TX MegaPort Module for NH208/215 (NH200MP).....**$1,129**

### CISCO SYSTEMS

PROStack EtherSwitch Stackable Ethernet Switch, Sixteen RJ45,Two Expansion Slots for High-Speed Modules, 100Base-TX/ATM (CPW1601A) .....**$3,935**
(CPW1601B).....**$4,582**
100Base-T module for PRO16,1 RJ45 (CPW100T).....**$972**
EtherSwitch 1200, Twenty-Five 10Base-T Ports, Two 100Base-TX,1K MAC (CPW1200).....**$5,359**
EtherSwitch 1400, Twenty-Five 10Base-T, Two Slots 8K MAC (CPW1402).....**$5,740**
One-Port 100Base-TX Module (CPW1411-X) .....**$686**
Eight-Port 100BaseTX Module (CPW1418-X) ....**$1,695**

### 3COM

LinkSwitch 1000, Twenty-Four Switched 10Mbps Port, One 100 Base-TX Fast Port (3C16900) .....**$3,445**
LinkSwitch 1000, Twelve Switched 10Mbps Ports, One 100Base-TX Fast Port(3C16901) .....**$2,645**

LinkSwitch 3000, Five Switched Fiber SC 100Base-FX Ports, One Switched copper 100Base-TX Port (3C16940) .....**$7,525**
LinkSwitch 3000, Eight Switched 100Base-TX Ports (3C16941).....**$5,575**

### ASANTE

Fast 10/100 Bridge, Integrate 100Mbps Fast Ethernet to Existing 10Mbps Ethernet .....**$969**
Ready Switch Four 10Base-T Ports, One 100Base-TX Port with SNMP.....**$2,049**

## 100 Mbps Fast Ethernet Adapters

### INTEL

Ether Express PRO/100 32-bit (PILA8465).....**$159**
Ether Express 10/100 PCI (PILA8465B) Single/5PK/20PK .....**$132/580/1995**
Ether Express PRO/100 32-bit EISA (EILA8265).**$235**


New Intel Smart 100 Nitro High Performance Server Adapter(PILA8485) .....**$715**

### 3COM

10/100 PCI (3C595TX) Single/5PK.....**$169/754**
10/100 EISA (3C597-TX)Single/5PK.....**$251/1228**

### COGENT

PCI Quartel,Full Duplex,4RJ45 Ports (EM400).....**$1,137**
10/100 PCI (EM110TX).....**$190**
10/100 PCI (EM440).....**$1,170**
10/100 ISA (EM110TX) Single/5PK .....**$195/924**

### SMC

10/100 EISA (SMC923DST) .....**$240**
10/100 PCI (SMC933DST) .....**$194**

### ASANTE

10/100 PCI Adapter for PC and MAC .....**$187**

## 100VG AnyLAN Adapter

### KATRON

100VG ISA Adapter (DP-16I) .....**$149**
100 VG EISA Adapter (DP-32E) .....**$192**

### HEWLETT PACKARD

100VG 16-bit ISA 10/100 (J2573A HP) Single/6PK.....**$170/985**
100VG 32-bit EISA (J2577A HP) Single/6PK .....**$227/1,319**
100VG 32-bit PCI (J2585A HP) Single/6PK.....**$166/890**

## 100Mbps FX Adapter

### COGENT

PCI-SC Connector (EM100) .....**$499**
PCI-ST Connector (EM100FX) .....**$499**
Eight-Port Fast FX Hub (S-800) .....**$3,285**

## FDDI Adapters

### NETWORK PERIPHERAL

SAS PCI Singlemode (NP-PCI-S50) .....**$599**
SAS PCI Multimode (NP-PCI-S10).....**$995**
DAS PCI Multimode (NP-PCI-D10) .....**$1,360**

## 100 Base-TX Fast Ethernet Hubs

### INTEL

Express Stackable Hub, Twelve I00Base-TX Ports Stackable up to Six Units (EC100TX) .....**$1,485**

### NBASE

100Base-TX Eight-Port Hub (NH108) .....**$1,425**

### NETWORTH

100Base-TX Eight-Port Hub (MICRO100).....**$1,350**
Dual Speed Fast Ethernet Hub Twenty Four-Port (MICRO10/100).....**$3,565**

### SMC

Tiger Hub 100 Sixteen-Port 100Base-TX Hub (SMC5116TX).....**$2,398**

### D-LINK

100 Base-TX Twelve-Port Hub (DFE-812TX).....**$1,342**

### ASANTE

100 Base-TX Twelve-Port Stackable Hub .....**$1,545**

### BAY NETWORKS

Twelve-Port 100Mbps Hub (AT2202-001) .....**$1,740**

### 3COM

100 Base-TX 12-Port Stackable Hub (3C250-TX/1) .....**$1,949**

## 100Base-T4

**Fast Ethernet with CAT 3 UTP Support**

### COGENT

10/100 PCI (EM110T4) .....**$190**

12-Port Stackable T4 Hub (S-1200) .....**$1,590**

## 100 VG AnyLAN Hubs

### KATRON

100VG-AnyLAN Hub, 6-Port/12-Port (DP1006/DP1012) .....**$840/1,330**

### HEWLETT PACKARD

Advanced Stack I00VG 15-Port Hub, Stackable up to 16 Hubs (J2410A) .....**$1,835**

## 100Mbps Macintosh

### FARALLON

Fast Ether TX-10/100 NuBus (PN990) .....**$328**
Fast Ether TX-10/100 PCI (PN994).....**$240**

### ASANTE

Fast 10/100 NuBus(99-00-364-00) .....**$299**

### ATM

**Efficient Networks**

155.52Mbps PCI ATM Adapter with 512K Memory (EN1-155P-MF-C) .....**$1,200**

### NBASE

Multimode to Singlemode ATM Converter, 20KM Single Link (Node Attach) (N420ATM1) .....**$3,995**

## Fibre Channel - The ATM Alternative

### ANCOR COMMUNICATIONS

Gigabit Fibre Channel, 1.0625 Gigabaud per Channel, Sixteen-Port FCS1062 Fibre Switch .....**$46,797**
FCS1062 PCI Adapter.....**$3,273**

Ethernet, FDDI, Token Ring LAN Interface Modules Available

## Internet & Remote LAN Access Products

### ADTRAN

T1 DSU/CSU, V.35 Dte N1-24, T1 and Fractional, B8ZS/AMI, SF/ESF Framing.....**$1,390**
TSU-T1,1200-.060 L1 Data Channel DSU/CSU.....**$995**

### ASCEND

PipeLine 25 ISDN Bridge, IP/IPX Routing, Compression, Built-in NT! (P25-1URTRCOF) .....**$999**
PipeLine 50 ISDN Bridge, IP/IPX Routing, Compression, Built-in NT1 .....**$1,020**

### PROTEON

RBX205 Router, One Ethernet, Two WAN, ISDN with IP/IPX S/W .....**$2,605**
Globetrotter 100 Remote Access Router, Four-Port Ethernet LAN Repeater, Two WAN Serial Ports with IP/IPX.....**$1,555**

### 3COM

NetBuilder Remote Office 422, ISDN Access Super Stack Router, IP and IPX (3C8422) .....**$2,699**

### ACC SYSTEMS

Nile Branch Office Bridge/Router with IP/IPX, AppleTalk, One RJ45 LAN Port, One ISDN BRI, One V.35 Port .....**$2,445**

### BAT

SU 56K DDS, Point to Point or Multipoint, DSU/CSU,V.35 InterFace, Front Panel LEDs .....**$425**

### CISCO SYSTEMS

2501-IP Router, One Ether Port, Two Serial Ports, Dial on Demand .....**Call For Prices**
2503-ISDN IP Router, One Ether Port, Two Serial Ports, ISDN BRI Demand .....**Call For Prices**

## Ethernet Network Adapters

### WEST HILLS

ISA BNC (ENET16C) .....**$35**
ISA RJ45 (ENET16T) .....**$35**

ISA RJ45/BNC (ENET16CT) .....**$39**
RJ45/BNC/AUI (HT2100PCI+PC1).....**$69**
RJ45/BNC/AUI (HT2100VL VLB) .....**$69**

**For SMC,3Com, and Intel Ethernet Adapters -Please Call**

## Hubs

### WEST HILLS

Eight-Port 10BT Hub, BNC & AUI Ports (HT08TP) .....**$110**
Sixteen-Port 10BT Hub, BNC & AUI Ports (HT16TP) .....**$235**

Sixteen-Port I0BT Smart Hub, AUI Ports (UE2041) .....**$290**

## Transceivers

AUI to TP .....**$39**
AUI to BNC .....**$39**
AUI to 10Base-FL .....**$249**
AUI to MultiMode Fiber (1300nm,5Km) .....**$449**
AUI to SingleMode Fiber (1300nm,10Km).....**$549**

## Fast Ethernet Guide

Switched and Fast Ethernet, How It Works and How to Use It, The Only Book Dedicated to The Latest in Ethernet Networking Technology.....**$39**

**Receive Your Free Copy With The Purchase Of Any Switch or 100Mbps Hub**

Visa & MasterCard • Fast Delivery • Most Orders Ship The Same Day • Prices Subject To Change Without Notice

NBASE COMMUNICATIONS
North Hills • Galcom • NBase Switch

ASANTÉ

Bay Networks

WEST HILLS LAN SYSTEMS
7949 Woodley Avenue, Van Nuys, CA 91406
**1-800-FOR-LANS**
**1-800-367-5267**
Technical Support: 818-773-8171 • Fax: I-818-773-8932

3Com

intel

ciscopro

**Reader Service No. 297**

# HUGE 3Com INVENTORY

NETBUILDER I-II, IB, CS, FMS I-II, ECS, MSH, 3GH, LANPLEX, MULTICONNECT, BICC

# LAN/WAN NEW/USED

3Com...CABLETRON...SYNOPTICS...SMC...CISCO...NOVELL...NETWORTH...BICC...Proteon +

**SUPER HUB DEALS!**

| | |
|---|---|
| 24 PORT 10BT | $700 |
| 12 PORT | $400/$250 |
| FMS2 24 PORT | $850 |
| FMS2 12 PORT | $475 |
| 6 PORT FIBER | $1350 |
| 10 PORT COAX | $1275 |

*MINIMUM QTY 3*

**SUPER NIC PRICES!!**

| | |
|---|---|
| 509B-TPO | $75* |
| 509B-COMBO | $95* |
| 509B-COAX | $90 |
| 509TP-PCI | $105* |
| 509-COMBO | $130* |
| 595TX-10/100 | $150* |
| 589B-TP PCMCI | $125 |
| 3Com 8 BIT TP | $30* |
| 619 16/4 TR | $150 |

**ROUTER VALUES!!**

| | |
|---|---|
| 5803 LOCAL | $950 |
| 58XX 2X2 T1 | $1250 |
| 8221 1X1 T1 | $1595 |
| 8227 1X3 T1 | $2900 |
| 8421 2X4 ISDN | $1995 |

MUCH MORE – CALL!!!

**NETWORTH (U)**

| | |
|---|---|
| UTPM-SMART | $495 |
| 4000/6 CHASSIS | $600 |

*MORE AVAILABLE!*

**SWITCHES**

| | |
|---|---|
| 3Com 24 PORT | $3200 |
| 3Com 6 PT/FDI | $4200 |
| ACTN 8 PORT | $1950 |
| BAY 6 PORT | $2100 |
| CISCO 16 PORT | $4700 |

LOTS MORE – CALL!

**FAST ENET**

| | |
|---|---|
| 3Com 12 PORT | $1925 |
| SMC 8 PORT | $1150 |
| SMC 16 PORT | $2200 |
| NTWRTH 8 PT | $1350 |
| HP 15 PORT | $2025 |

MORE BRANDS – CALL

**CISCO (U)**

| | |
|---|---|
| IGS/R | $700 |
| AGS+ | CALL |
| 25XX | CALL |
| CSCME6 | $2200 |

*MORE AVAILABLE!*

**TOKEN RING (U)**

| | |
|---|---|
| IBM 8228 | $95 |
| STARTEK | CALL |
| IBM 16/4 TR | $150 |
| INTEL 16/4 | $130 |
| PROTEON 16/4 | $100 |
| 3COM 16/4 | $130 |

LOTS MORE – CALL!

**HUBS**

| | |
|---|---|
| EAGLE 8 PORT | $100 |
| BAY 12 PORT | $625 |
| BAY 24 PORT | $995 |
| SMC 12 PORT | $400 |
| BOCA 16 PORT | $295 |

PLENTY MORE!

**SUPER NIC DEALS!!**

| | |
|---|---|
| SMC 8416T | $70* |
| SMC 8432BT | $125* |
| PCLA8225 | $75* |
| PCLA8100 | $65* |

MANY MORE-CALL

**PROTEON (U)**

| | |
|---|---|
| CNX/DNX | CALL |
| P7XXX | CALL |
| P9XXX | CALL |
| P2XXX | CALL |

*PLENTY OF STOCK!*

**NETWARE**

| 5 | 10 | 25 | 50 | 100 |
|---|---|---|---|---|
| $595 | 1195 | 1525 | 1795 | 2695 |

**USED 3Com**

Just Too Much To List – We Have Almost Every Product 3Com Ever Created!! *PLEASE CALL!!!*

**CABLETRON (U)**

| | |
|---|---|
| TPMIM-24 | $995 |
| THINMIM | $500 |
| MT800 | $125 |
| IRBM | $700 |
| IRM2 | $750 |
| MR9000C | $495 |
| FR3000 | $700 |
| MR2000C | $325 |
| MMAC8-FNB | $550 |
| MMACM8FNB | $675 |
| TPMIM | $350 |
| TPMIM-34 | $1200 |
| TPMIM-T3 | $350 |
| TPMIM-44A | $1800 |
| TRMIM-12 | $600 |
| PSM-R | $325 |

MUCH MORE – CALL

**SYNOPTICS (U)**

| | |
|---|---|
| 3308 | $395 |
| 3001-01 | $395 |
| 3002 | $450 |
| 2715-04 | $800 |
| 208ST | $250 |
| 2800 | $400 |
| 3512 | $350 |
| 3030-01 | $350 |
| 3304ST | $995 |
| 3000N | CALL |
| 3307HD | CALL |

GIVE US A CALL!

*ERGONOMIC INC. 47 Werman Court • Plainview, NY 11803 • Purch: 516-293-5200 • FAX: 516-293-5325*

WE WARRANTY! WE BUY YOUR USED LANS/WANS QTY DISCOUNTS!

VISA/MC/AMEX COD & Terms

FOR SALES ONLY CALL TOLL FREE OUR 14TH YEAR!

**800-AKA-3Com (800-252-3266)** U=Used

Circle Reader Service No. 271

---

**NETWARE COMPETITIVE PRICES***

| NOVELL # USER | Netware ver. 3.12 | Netware ver. 4.1 |
|---|---|---|
| 5 | 495. | 495. |
| 10 | 995. | 995. |
| 25 | 1,495. | 1,495. |
| 50 | 1,995. | 1,995. |
| 100 | 2,795. | 2,795. |
| 250 | Call | Call |

NOVELL UPGRADE 60% OFF LIST

**FREE** • FedEx 2nd day shipping (in US) • CNE Support

yes It runs with NetWare

* Special Novell Promotional Packages-qualification required

- Netware SAA v.2.0 / 16-session . . . $ 1,095.
- Netware SAA v.2.0 / 64-session . . . $ 3,295.
- Netware SAA v.2.0 / 128-session . . $ 4,695.
- Netware SAA v.2.0 / 254-session . . $ 8,245.

BRING US YOUR BEST DEAL **WE'LL BEAT IT !!**

- Hubs: 10Base-T, 100Base-T, 100VG-AnyLAN
- Adapters: 10Base-T, 100Base-T, PCMCIA
- Bridges • Repeaters • Transceivers • Cables...

WE CARRY A FULL LINE OF NETWORKING PRODUCTS FROM ALL MANUFACTURERS.

KEYNET CORPORATION

CALL US FOR ALL YOUR NETWORKING NEEDS!!!

(800) 307-5242

or Fax (714) 378-4757

E-Mail: keynet9@wavenet.com

We Accept VISA • MASTERCARD A.E. • P.O. • COD

* Prices are subject to change without prior notice.

* Novell & Netware are registered trademarks of Novell, Inc.

Circle Reader Service No. 263

---

*INFORMATION DATA PRODUCTS CORP.*

Modems
Multiplexers
DSU/CSU's
T-1/FT-1
Voice/Data
Bridges/Routers

New - Refurbished
"Data Communications Specialists"

1-800-362-3770

wan-info@planet.net
http://www.planet.net/idpc

Circle Reader Service No. 217

---

# It's Real for CNE Tests

7 Manuals for Each Track
**3.1x Track $450**
**4.1 Track $495**
Meets Novell's new requirement

✔ Concise to-the-point specifically written for professionals
✔ Being used even in universities

**CNE Test Master for Windows $149**

Software that has more than 2600 multiple choice practice questions for 11 Novell CNE tests covering both 3.1x & 4.1 tracks • Novell CNE Study Guide • MTL (Demo) • NSE Pro (CD-ROM)

When you order all 7 manuals and Test Master

**PC Age, Inc.**

1-800-PCAGE-60 (800-722-4360)
20 Audrey Place; Fairfield, NJ 07004
Tel. 201-882-5370 • Fax. 201-882-4955
visit us on the WEB at
http://www2.cybernex.net/~pcage
or e-mail pcage@bc.cybernex.net

Circle Reader Service No. 248

---

# It's As Easy As...

**1** Decide to reach 150,100 highly-qualified and audited buyers of networking products and services.

**2** Pick up the phone and call Carla Cappucci at 800-622-1108 ext. 465.

**3** Sit back and watch the results of your ad in *Network World's* Marketplace.

---

# Hot Leads, Hot Leads, Hot Leads!

*Network World's* Marketplace section is the best way to help your sales staff reach the hottest leads in the Networking Industry.

More than 150,000 prequalified Network IS Professionals put your sales goals within reach.

**Direct Response Advertising**
**(800) 622-1108 ext. 465**

---

For More Information About Marketplace
1-800-622-1108

---

**NEW REFURBISHED BUY SELL NEW REFURBISHED BUY SELL**

# MSI Communications

Nationwide Services • 24-Hour Technical Support
CNE Services • Trade-In Credit

| WAN Products | Distribution Products | | LAN Products |
|---|---|---|---|
| Adtran | Codex | Spectron | Bay Networks |
| AT&T Paradyne | GDC | Symplex | Cisco |
| BAT | IBM | Tellabs | Compression Labs |
| Digital Link | Micom | Timeplex | Cubix |
| INC | Motorola | UDS | Develcon |
| Micom | Racal Milgo | Vitalink | Livingston |
| NET | | | Madge |
| Newbridge | | | Novell |
| Verilink | | | Xyplex |

**Specialized Products**

*Refurbished*

**CISCO SYSTEMS**

AGS+, 2500's, 4000's, 7000's

Data, Voice & Video Networking
7 Waterloo Road, Stanhope, NJ 07874
800-866-3282 • 201-347-3349 • FAX 201-347-7176
http://www.msic.com

An ESOP Company.....Where the Employees are Owners

Circle Reader Service No. 232

---

**NETWORK HARDWARE**

ROUTERS • HUBS • BRIDGES • MODEMS • MUXES
DSU/CSU • FRAME RELAY • T1 • ISDN

BUY/SELL/LEASE

**-CISCO-**

MOTOROLA • ASCEND • LIVINGSTON • 3COM
BAY NETWORKS • CISCO • ADTRAN • US ROB

800-230-6638

Fax: 805-964-5649

Network Hardware Resale, Inc.
1800 The Strand • Hermosa Beach, CA 90254

Circle Reader Service No. 244

---

**Your Ad Could Be Here For $278**

Wouldn't you prefer to have your customers looking at what you have to offer here?

Carla Cappucci
800-622-1108

---

**VANDY FOR ALL YOUR NETWORK NEEDS!**

**Network S/W**

| | |
|---|---|
| All Novell (Best Prices) | $ CALL |
| Microsoft | $ CALL |

**10/100 ENET Switch**

| | |
|---|---|
| Bay Network | |
| 10/100 Mbps UTP Sw | $13,850 |
| 100 Mbps Fiber Sw Hub | $13,950 |
| Networth | |
| Fast Pipes 6 port hub | $3,495 |
| Fast Pipes 12 port hub | $3,990 |

**100baseTx Fast ENET Hubs**

| | |
|---|---|
| 3COM | |
| 100BTX 12 port stack | $1,895 |
| Networth | |
| 100BTX 8 port hub | $995 |
| Dual speed ENET 24 port | $3,490 |
| Bay Network | |
| 100BTX 12 port hub | $1,655 |

**100 Mbps ENET Adapters**

| | |
|---|---|
| 3COM | |
| 10/100 PCI 1/5pk/20pk | $148/670/2595 |
| Cogent | |
| 10/100 PCI 1/5pk/20pk | $195/755/2685 |
| 10/100 PCI (EM440) | $1120 |
| 10/100 ISA 1/5pk/20pk | $190/895/3555 |

**Internet & Remote LAN Access**

| | |
|---|---|
| 3COM | |
| Netbuilder remote 422/ISDN | $950 |
| Ascend | |
| ISDN, Pipeline 25 RJ-45 | $795 |
| ISDN, Pipeline 25 S/W | $265 |
| ISDN, Pipeline 50 | $795 |
| ISDN Pipeline 400 BRI | $5,580 |
| Cisco | |
| 2501 IP-Router | $1,860 |
| 2503 ISDN BRI Router | $2,250 |

**ATM Switches/Routers**

| | |
|---|---|
| Bay Network | |
| Lattiscell ATM Switch 16 Port | $19,950 |
| ENET/ATM Router/Mux 12/10BT 1/156 Mbs | $8,820 |

**ATM Interface Cards**

| | |
|---|---|
| Adaptec | |
| ANA-5910/128 25.6mbs ATM PCI 128K | $310 |
| ANA-5910/512 25.6mbs ATM PCI 512K | $415 |
| ANA-5930/512 155mbs ATM PCI UTP | $795 |
| ANA-5930/512 155mbs ATM PCI Fiber | $895 |
| 3COM | |
| ATM Link S-Bus 155mbs Fiber Adapter | $1295 |

**Video Conferencing**

C-Phone-Network based Video Conferencing system, Incl: Camera/Speaker/MIC, Full Screen Video, No N/W Bandwidth degradation, Up to 64 Simultaneous calls, H.320, ISDN up to 384K, T1, SW56, WAN Connectivity or Standalone available.
Starting At $1895 Per Seat - Call for Details!

Vandy-Micro Corporation
27001 La Paz Rd Ste 284
Mission Viejo, CA 92691

**(800)373-2485**

Tel: (714)768-1595, Fax: (714) 768-1063
EMAIL: vandy5@ix.netcom.com
CORPORATE OR SCHOOL / P.O.'s WELCOME

VISA/MC/AMEX
Prices and Specifications Subject to Change.
All Trademarks and Trade Names are the Property of their Respective Holders

Circle Reader Service No. 221

---

**NEW EQUIPMENT ONLY NEW EQUIPMENT ONLY**

850 Vendors & 30,000 Products on our Web Site!

# Attention IS and Procurement Managers!

Stretch your budget by an additional 15 to 30% **and more!** We emphasize only U.S. and Industry Leaders while providing their products at exceptionally competitive prices.

Call for an immediate price Quote and we'll fax or mail you a 2-page Brochure with over 500 of the Networking and Data Comm Industry's Hottest Products! Categories include:

100MBPS SYSTEMS, SWITCHING HUBS, BRIDGES, ROUTERS, REMOTE ACCESS, ISDN CONNECTIVITY, ATM, CSU/DSU, NOS, E-MAIL, UNIX, NIC'S, CONVERTERS, REPEATERS, HUBS, MAINFRAME CONNECTIVITY, NETWORK UTILITIES, PRINT SERVERS, TAPE BACK-UP, CD ROM, UPS, SECURITY, NETWORK UTILITIES AND MORE!

**AUDAX COMMUNICATIONS, INC.**

Call Toll-Free
1 (800) 589-8709
or fax 1 (415) 589-9100

© 1996

Sign on to our Web Site! http://www.audaxcom.com

Circle Reader Service No. 290

LAN/WAN • BUY/SELL
MODEMS — FULLY WARRANTEED
DSU/CSU's — NEW/REFURBISHED
MULTIPLEXERS — RENTAL
T-1 EQUIPMENT — LEASE
HUB, BRIDGES, ROUTERS, ETC.

Fibermux Cabletron Synoptics

**CISCO SPECIALISTS**

AT&T Bay Networks

*We carry all manufacturers, call John, ext. 101.*

ADCS INC.

PHONE 800-783-8979

FAX (916) 781-6962

Circle Reader Service No. 240

---

# NOVELL NETWARE V4.1

| | |
|---|---|
| *5 USER | $ 499 |
| *10 USER | $ 999 |
| *25 USER | $1299 |
| *50 USER | $1499 |
| *100 USER | $1899 |

250, 500, 1000 User and V3.12 call for price.

**WE WILL BEAT OR MATCH ANY ADVERTISED PRICE**

For more products visit us on-line
http://www.fcsnet.com
Prices are subject to change.

**FIRST COMPUTER**
**1-800-325-1911**

Circle Reader Service No. 277

---

# ROUTERS
## BUY / SELL / REPAIR

CISCO WELLFLEET
IBM 3COM CABLETRON
SYNOPTICS PROTEON

COMSTAR Buys, Sells and Repairs NETWORK Equipment.

Bridges • Routers • Hubs
NIC's•5250/3270•Emulation•MAU's/CAU's/LAM's

**COMSTAR, INC.**
*The #1 NETWORK Remarketer*
**612-835-5502** HLH-A

FAX: 612-835-1927
5250 W. 74th St., Minneapolis, MN 55439

Circle Reader Service No. 234

---

# USED CISCO DIRECT

➤Routers ➤Switches
➤Hubs ➤Modems
➤ISDN/ATM ➤NICS
➤T1 CSU/DSUs

CISCO SYSTEMS

**WE BUY USED**

➤Synoptics ➤3COM ➤IBM ➤Modge
➤Ascend ➤Cobletron ➤USRobotics ➤Shivo
➤Motorolo ➤Boy Networks ➤Livingston
➤ADC Kentrox ➤Sun ➤Intel

**m/Net**

*m/Net Communications Inc. 43-26 52nd Street Woodside NY 11377*
*Voice 718-565-3033, Fax 718-899-1019, Web www.mnetcom.com*

**DIGITAL WAREHOUSE**
*Your Information Superhighway Discount Source*
VISA **1-800-553-4383** M/C

Circle Reader Service No. 259

---

# INTERNET SERVICE PROVIDERS & WEB HOSTS

**EMI Communications**
(800) 456-2001 National
info@emi.com
PPP, Shell, Leased Lines, Frame Relay

**IBM Internet Connection**
(800) 455-5056 National
globalnetwork@info.ibm.com
SLIP, Leased Lines

**Global Internet**
(800) 682-5550 National
http://www.gi.net
Leased Lines, Frame Relay, Network Security & Mgmt, Web Hosting

**InterNex Information Svcs.**
(408) 327-2388 California
info@internex.net
Leased Lines, ISDN, SMDS, Frame Relay, Web Hosting, T1, T3, Intranet

**GridNet International**
(800) GridNet (474-3638) National
www.gridnet.com
SLIP, PPP, Leased Lines, ISDN, Frame Relay, V.34(28.8)

**New York Net**
(718) 776-6811 NY/NJ/CT/PA/MA
sales@new-york.net
SLIP, PPP, Leased Lines, T1s, Frame Relay, 10Mbps

**HoloNet Web Hosting**
(510) 704-0160 National
http://www.holonet.net
ONE FREE month 56kbps Web Hosting

**UUNET Tech. (AlterNet)**
(800) 258-9690 National
info@uu.net
Web Srvrs, Frame Relay, ISDN, PPP, Leased Lines, Security, SLIP, UUCP

**For information on listing your service here, contact Carla Cappucci at 800-622-1108 x465, ccapp@nww.com**

---

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

# WANTED TO BUY

## NETWORKING PRODUCTS AND SERVICES

**Over 150,000 qualified subscribers of Network World are ready to buy.**

**Call today to place your ad in the Marketplace!**

**1-800-622-1108 ext. 465**

$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

---

# KEYCAP ENGRAVING

## Servicing The Computer Industry

**FAST** and **ACCURATE** keycap engraving makes your keyboard customized in any situation and any language. Symbols, Special Languages, Prototypes and volume engraving available.


**BRYANT'S ENGRAVING SERVICE**
**830 Clay Street, Winter Park, FL 32789**
**407-644-9790**

Circle Reader Service No. 222

---

Call for Quantity Pricing

# NETWORK CENTRAL

THE WORLD'S #1 SOURCE FOR NETWORK PRODUCTS & COMPUTER HARDWARE

**Network Cards-Ethernet**

| | |
|---|---|
| NE2000 ISA Compatible | $17.00 |
| • ThinNet RG-58 BNC Only-Jumperless | |
| NE2000 ISA Compatible | $22.50 |
| • Combo BNC/10baseT | |
| • Jumperless/Jumpered choice on card | |
| PCMCIA 10 BaseT/BNC Combo Card | $69.00 |
| PCI Combo NIC | $39.00 |
| Pocket Ethernet Adapter for Parallel Port | $72.00 |
| Novell Personal NetWare Starter Kit | $69.00 |
| • Includes 2 Cards/Software/Cabling | |

**Ethernet Hubs. Concentrators & Accessories**

| | |
|---|---|
| 5 Port Mini/8 Port EtherNet Hubs | $66/82 |
| 16/32 Port Hubs | $189/299 |
| 2 Port RG-58/BNC Repeater | $129.00 |
| 6 Port RG-58/BNC Hub/Repeater | $299.00 |
| Transceivers AUI to BNC or 10baseT | $39.00 |
| Cat 5 Patch Panels 12/16 port | $99/129 |

**100baseTx Hubs and NIC's**

| | |
|---|---|
| PCI Network Interface Card | $109.00 |
| 8 Port Hub | $899.00 |

**Memory & CPUs**

| | |
|---|---|
| 4/8/16Meg 72 Pin-70ns | $39/89/229 |
| 486-80 / 100 / 586-133 | $31/49/59 |
| 686-P120+ Cyric w/bb fan | $179 |

**BNC RG-58 (Thin Net) Parts**

| | |
|---|---|
| Tees F/M/F | $1.85 |
| Splice F/F | $1.25 |
| 50 OHM Terminators | $1.25 |
| BNC Connectors Crimp/Twist On | $.75/.95 |
| Wall Plate w/dual female connectors | $3.50 |
| Crimping Tools without/with Rachet | $15/20 |
| Stripping Tool | $19.00 |

**RG-58 Coaxial Cable**

| | |
|---|---|
| RG-58 A/U Cable w/BNC Connectors | |
| • 6 / 10 / 15 ft | $2.35/3.15/3.95 |
| • 25 / 50 / 100 ft | $5.75/7.15/14.95 |
| 1000 ft spools RG-58 U/RG-58 AU | $49/99 |

**10baseT (RJ-45, 8P8C) Parts**

| | |
|---|---|
| Coupling | $.95 |
| Crimp-On Connectors | $.75 |
| Surface Mount Jack | $1.49 |
| Wall Plate w/Jack(s) - Sgl/Dbl | $2.00/2.70 |
| Keystone Jack Cat 5 | $5.25 |
| Keystone Jack Cover Plate Sgl/Dbl | $1.50 |
| Punch Down Tool w/Keystone 110 Bit | $20.00 |
| Crimping Tool | $15.00 |
| RJ-45 Cable Tester 1 piece/2 piece | $49/69 |

**10baseT (RJ-45) Cabling**

| | |
|---|---|
| Patch Cables w/RJ-45 Connectors Catagory 5 | |
| • 3 / 7 / 14 ft | $2.25/2.75/3.65 |
| • 25 / 50 / 100 ft | $5.30/10.50/14.50 |
| 1000 ft spool Cat 5 | $89.00 |

**Motherboards**

| | |
|---|---|
| 486 SX-40 VLB w/CPU | $53.00 |
| Pentium 90/100/120/133 | $95.00 |
| 586DX VLB 80/120/133 128k Cache | $69.00 |
| 586DX PCI/VLB/ISA | $65.00 |

**Drives**

| | |
|---|---|
| CD Rom 4X / 6X | $46/69 |
| 1.2 / 1.6 GigByte | $199/235 |
| 16 Bit SB Pro Compatible Sound Card | $209.00 |

**Check BBS for Latest Info and Complete Product & Price List**
See Bulletin 5 & File Area 14.
Availability and prices subject to change Without Notice.

**NetWork Central**

| Orders Only | BBS | FAX |
|---|---|---|
| 1(800) 576-0662 | (619) 467-0666 | (619) 467-0665 |

Charge Cards Accepted, but
All prices reflect 3% cash discount

Circle Reader Service No. 228

---

# NOVELL PROMOTIONAL SOFTWARE

| | | | |
|---|---|---|---|
| 4.1 - 5 | $415 | 3.12 - 5 | $435 |
| 4.1 - 10 | $845 | 3.12 - 10 | $895 |
| 4.1 - 25 | $1295 | 3.12 - 25 | $1395 |
| 4.1 - 50 | $1695 | 3.12 - 50 | $1895 |
| 4.1 - 100 | $1995 | 3.12 - 100 | $2395 |
| 4.1 - 250 | $Call | 3.12 - 250 | $Call |

**Netware for SAA V2.0**

| | |
|---|---|
| SAA - 16 Session | $995 |
| SAA - 64 Session | $2495 |
| SAA - 128 Session | $3495 |
| SAA - 254 Session | $4995 |

**Managewise V2.0**

| | | | |
|---|---|---|---|
| 5 User | $495 | 50 User | $1695 |
| 10 User | $795 | 100 User | $2385 |
| 25 User | $1195 | 250 User | $3250 |

**Call PCT 714-380-3790**

FREE SHIPPING
ORDERS OVER $2000, COD
PRICES SUBJECT TO CHANGE.

Circle Reader Service No. 241

---

SAVE 50% & MORE ON MOST PRODUCTS

**BUY/SELL/NEW/USED**

VISA RENT MC

**Reconditioned With Warranty**

**Modems • Multiplexers • T-1 CSU/DSU's • Channel Banks**

| | |
|---|---|
| CSU/DSU, ALL RATE, V.35/RS232 | $99 |
| Newbridge Channel Banks | $2995 |
| Micom Marathon 1K, 5K, 10K | 50% off |
| AT&T CSU/DSU NEW! | $275 |
| T-1 CSU's | $359 |
| CSU/DSU 56KBPS, V.35 | $195 |
| Telco Systems Channel Banks | $2995 |
| Newbridge 3600 Modules | CALL |
| Datatel DSU/CSU 56KBPS | $375 |
| AT&T Channel Banks | $2995 |
| Stat Muxes 4, 8, 16, 32, port | LOW |
| T-1 CSU/DSU V.35 | $895 |
| Channel Bank Rentals | $299/month |

**METROCOM**

(800) 364-8838 or (713) 495-6500
FAX (713) 495-8449 24 HRS
HTTP://www.MetrocomInc.Com

Circle Reader Service No. 220

---

REFURBISHED

**SynOptics®** Bay Networks

**Largest Inventory of Refurbished SynOptics in America!**

- SynOptics Trained
- SynOptics Authorized
- One Year Warranties
- Proven Track Record
- We Stock What We Sell!
- We Buy Used Equipment

CABLETRON SYSTEMS — The Complete Networking Solution™ — NOVELL — 3Com — IBM — Wellfleet — proteon

**WE REPAIR ALL SYNOPTICS**

# National LAN Exchange

# 800-243-LANS

5 2 6 7

1403 W. 820 N. Provo, UT 84601 Voice 801-377-0074 FAX 801-377-0078

VISA MC

Circle Reader Service No. 231

## NETWORK WORLD, INC.


THE MEADOWS
161 WORCESTER ROAD, FRAMINGHAM, MA 01701-9172
(508) 875-6400/FAX: (508) 879-3167

Colin Ungaro, President/CEO
Evilee Thibeault, Senior Vice President/Publisher
Mary Kaye Newton, Assistant to the President
Eleni Brisbois, Sales Associate

**ADMINISTRATION**
Mary Fanning, Vice President Finance and Operations
Frank Coelho, Office Services Manager
Paul Mercer, Billing Manager
Mary Rinaldo, Telecommunications Administrator
Tom Garvey, Mailroom Supervisor
Tim DeMeo, Mailroom Assistant

**HUMAN RESOURCES**
Mary Cornetta Brown, Human Resources Director
Danielle Volpe, Human Resources Assistant

**MARKETING**
Virginia Lehr, Director of Marketing
Joanne Wittren, Senior Marketing Services Manager
Kristin Wattu, Marketing/Promotions Manager
Barbara Sullivan, Market Research Analyst
Heidi Creighton, Public Relations Manager
Donna Kirkey, Reprint Manager/Sr. Graphic Designer
Nancy Vickers, Graphic Designer

**ADVERTISING OPERATIONS**
Karen Wallace, Manager of Advertising Operations
Cathy Sampson, Sr. Advertising Account Coordinator
Ann Jordan, Advertising Account Coordinator
Marlo Matoska, Direct Response Ad Coordinator

**PRODUCTION**
Ann Finn, Production Director
Greg Morgan, Production Supervisor

**RESEARCH**
Ann MacKay, Research Director

**CIRCULATION**
Deborah Winders, Vice President Circulation
Richard Priante, Director of Circulation
Bobbie Cruse, Assistant Circulation Director
Mary McIntire, Circulation Assistant

**IDG LIST RENTAL SERVICES**
Christine Cahill, Sales Representative
P.O. Box 9151, Framingham, MA 01701-9151
(800) 343-6474/(508) 370-0825, FAX: (508) 370-0020

**PROFESSIONAL DEVELOPMENT GROUP**
William Reinstein, Senior Vice President/Business Development
Debra Becker, Marketing Manager
Ann Roskey, Product Manager/Online Services
Ed Garabedian, Systems Specialist/Online Services
Christie Sears, Finance/Operations Manager
William Bernardi, Senior Product Specialist
Peter Halliday, Product Manager/NetDraw
Tina Pescaro, Operations Assistant
FAX: (508) 820-1283

**NETWORK INFORMATION/ DIGITAL IMAGING SERVICES**
Jack McDonough, Network Director
Eric Powers, Network IS Support Specialist
Rebecca Simson, IS/Online Assistant
Anne Nickinello, Digital Imaging Manager
Deborah McKenna, Imaging Specialist
FAX: (508) 875-3090

**DISTRIBUTION**
Bob Wescott, Distribution Manager
(508) 879-0700


## IDG



## SALES OFFICES


**Carol Lasker, Advertising Director**
Debbie Lovell, Sales Associate
161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 628-3976

**NORTHEAST**
Thomas J. Soevyn, Manager Strategic Projects
Debbie Lovell, Sales Associate
Donna Pomponi, Senior District Manager
Nancy Robinson, District Manager
Jolene Springfield, Sales Assistant
161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 628-3976

**MID-ATLANTIC**
Jacqui Di8ianca, Senior District Manager
Rick Groves, District Manager
8arbara Stewart, Sales Assistant
351 E. Conestoga Road, Wayne, PA 19087
(610) 971-1530/FAX: (610) 975-0837

**MIDWEST**
Robert Mitchell, District Manager
Anna Caran, Sales Assistant
1011 E. Touhy Avenue, Suite 550, Des Plaines, IL 60018
(708) 297-8855/FAX: (708) 827-9159

**CENTRAL**
Dan Gentile, Midwest Regional Manager
Anna Caran, Sales Assistant
14205 8umet Road, Suite 534, Austin, TX 78728
(512) 246-7044/FAX: (512) 246-7703

**NORTHWEST**
Sandra Kupiec, Western Regional Manager
Vivian Ritondale, Senior District Manager
Paula Connor, District Manager
Cynthia Schaeffer, District Manager
Carol Stiglic, Inside Sales Representative
Beverly Davis, Sales Assistant
Tracie 8rown, Sales Assistant
5201 Great America Parkway, Suite 440, Santa Clara, CA 95054
(408) 567-4150/FAX: (408) 567-4166

**MOUNTAIN REGION**
Mike Hiatt, District Manager
Brooke Daniels, Sales Assistant
One East Center Street, Suite 300, Provo, UT 84601
(801) 371-0625/FAX: (801) 371-0669



**SOUTHWEST**
Amy C. Bartulis, District Manager
Tracy Pennell, Sales Assistant
2171 Campus Drive, Suite 100, Irvine, CA 92715
(714) 250-3006/FAX: (714) 833-2857

**SOUTHEAST**
Don Seay, District Manager
Terry Sanders-Prentice, Sales Assistant
Lakeside Commons, 990 Hammond Drive,
Suite 600, Atlanta, GA 30328
(770) 394-0758/FAX: (770) 394-6354

**DIRECT RESPONSE ADVERTISING**
**Response Card Decks/Marketplace**
Joan 8ayon Pinsky, Director Direct Response Advertising
Clare O'8rien, Sales Manager
Richard Black, Account Executive
Carla Cappucci, Account Executive
Heather Fairbanks, Account Executive
Sharon Chin, Sales/Marketing Operations Coordinator
Chris Gibney, Sales Assistant
(508) 875-6400/FAX: (508) 628-3976

**RECRUITMENT ADVERTISING**
Pam Valentinas, Director of Recruitment Advertising
Tarji Murray, Sales Associate
(508) 875-6400/FAX: (508) 820-0607


## EDITORIAL INDEX



## ADVERTISER INDEX



**Network World Fusion - www.nwfusion.com**

| Advertiser | Marketplace Advertiser |
|---|---|
| Bay Networks | Astrocom |
| Digital Equipment Corporation | Avalan Technology |
| In Focus | Capella Worldwide |
| Microsoft | Cylink |
| Nortel | Excel Computer |
| Novell | Distinct Corporation |
| Sprint | Frontier Technologies |
| Stratacom | Internet Security Corporati |
| | MaxNet |
| | Silcom |
| | TAC Systems Inc. |
| | TGV |

*These indexes are provided as a reader service. Altho every effort has been made to make them as compl as possible, the publication does not assume liability f errors or omissions.*

## DIRECTORY OF SERVICES

## Java

*Continued from page 1*

developers because they can be productive in it quickly if they have C++ experience. And Java is real now — you can actually write programs in it and run them, more or less, in Netscape Communications Corp.'s Navigator browser.

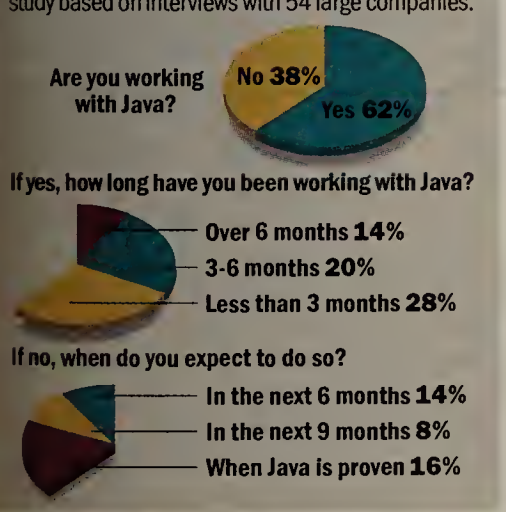
ActiveX, meanwhile, is enticing developers who have already committed to Windows and Microsoft's OLE component technology. Another key attraction is its promise to let developers incorporate the big inventory of third-party and in-house OLE controls into new ActiveX Internet/Web applications.

But the numbers don't lie about the way Java has captured the development community's imagination: Sun's JavaSoft unit has licensed Java to 35 vendors, and the Java Workshop developers' kit has been downloaded by 45,000 people, 80% of whom use Windows 95 or Windows NT. Also, this week's JavaOne conference will draw about 5,500 developers.

Java developers are already building test applications, and so far, they like what they see. "What really surprised me was that these products are still so much in their infancy, but we could put together a proof-of-concept application that actually works," said John Peak, a partner with Five Point Consulting, an Atlanta-based business applications developer that created a distributed Java application for accessing a corporate database.

**Flocking to Java**

Preliminary results from a new Forrester Research study based on interviews with 54 large companies.




Java is a solid, client-based application development tool, but it lags on the server side, said William Blundon, president and chief operating officer at SourceCraft, Inc., a Burlington, Mass., vendor of Internet and Java development tools. "It will be another year for it to be world-class [quality]," he said. "But ActiveX is two years away from being world class."

By simply announcing ActiveX this past spring, however, Microsoft seems to have forestalled a stampede by its software developers to Java. With ActiveX, which is simply the new name for OLE and OLE controls, Microsoft has tried to create a complete development framework that embraces the nature of the 'Net.

But today, almost every element in ActiveX is a promise: The key products that implement ActiveX are now only in beta or even alpha software. While Microsoft has enlisted partners to port its object model to non-Microsoft operating systems, a schedule for these releases has not been announced. And Microsoft's Distributed Component Object Model has only just come out with the Beta 2 release of Windows NT 4.0.

Yet the promises are compelling for many developers. FlexiInternational Inc., a Shelton, Conn., vendor of general business financial applications, considered rewriting in Java key parts of its C++ application suite. The reason: to create a single set of source code that could run on various platforms.

But ActiveX changed the company's thinking. "We can now have a single source code base for not only our client/server applications, but also our Internet ones," said George Dearing, director of product technology at FlexiInternational. "With ActiveX, we can take the same source code and use ActiveX as the delivery mechanism and securely land [this code] on the browser."

Both Microsoft and Sun still have a lot to do. And neither one can deliver everything users need. "There are a lot of different things developers need to do on the Internet," said David Smith, research director at Gartner Group, Inc. in Stamford, Conn. "There is no universal tool yet, so keep your options open." ■

## AT&T

*Continued from page 1*

which combines voice and data traffic into a single overall contract at individually negotiated deep discounts.

Tariff 12 discounts are based on minimum annual commitments (MAC) that tote up a user's entire telecommunications spending. As a result, AT&T customers for the first time will be able to combine their frame relay dollars with outbound toll, 800 and other traditional expenditures to get the maximum benefit.

The move not only presents users with a big savings opportunity, it also appears to solve a looming problem caused by WAN migration strategies, said user attorney Ellen Block.

Many Tariff 12 users have multimillion-dollar MACs that include heavy spending on private lines, Block explained. Should these users replace their private lines with frame relay nets outside of Tariff 12, they would be in danger of falling short of their MACs and losing their discounts, she said. Now they will be able to substitute the frame usage for private lines without fear of scuttling those savings.

The move could even entice some users on AT&T's popular contract tariffs — which typically just discount AT&T's regular prices and tack on strict usage requirements — to ask AT&T to move them over to Tariff 12. Observers caution that AT&T often steers all but the most fought-over users to contract tariffs and zealously enforces termination clauses.

But Steve Sobolevitch, an AT&T frame relay product manager, said, "We would consider [migration to Tariff 12] on a case-by-case basis."

AT&T's new offer comes with a legal catch that could trip up users unaware of it.

Unlike contract tariffs, Tariff 12 contains a provision in which AT&T waives the right to raise a user's rates in the middle of a contract.

But in its May 13 filing with the Federal Communications Commission to add frame relay to Tariff 12, AT&T stuck in a clause declaring that the Tariff 12 rate-like waiver does not apply.

Block called the new exception "offensive and irritating," but said users have a way around it. Clauses in each user's specific deal can override the general Tariff 12 regulations, she said, and users should ask for price protection on Tariff 12 frame relay when approaching AT&T. Said AT&T's Sobolevitch: "We can negotiate that with the client."

The Tariff 12 frame relay offering is technically a new service dubbed V-FRS — a play on Tariff 12's official name, Virtual Telecommunications Network Service, though that moniker has little relationship to current industry uses of the term "virtual." But all of the key technical details of V-FRS are the same as those in AT&T's popular InterSpan frame relay service (see graphic). Sobolevitch said users with relatively small frame relay nets may not benefit from V-FRS because the dollars spent would be such a small proportion of their MAC that it would not make much difference.

The best candidates for V-FRS are those whose frame nets are rapidly expanding, he said.

"We have many customers with very large deployment programs," Sobolevitch said. And AT&T is willing to let users "hop on this in the middle of their [contract] term." ■

### ALL THE BELLS AND WHISTLES

**Like AT&T's InterSpan frame relay, AT&T's new frame relay service for Tariff 12 users offers:**

- Domestic ports of 56K to 1.544M bit/sec
- One- and two-way domestic permanent virtual circuits (PVC) of 4K to 1.024M bit/sec in committed information rate
- Ports and PVCs between the U.S. and specified foreign countries
- Disaster recovery options such as back-up and expandable PVCs
- Credits for outages of 30 minutes or more
- Basic discounts ranging from 14% to 26% based on term and volume

**NetworkWorld**

161 Worcester Road
Framingham, Mass. 01701-9172
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385662. *Network World* (ISSN 0887-7661) is published weekly, except for a single combined issue for the last week in December and the first week in January by *Network World*, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Nonqualified subscribers: $5.00 a copy; U.S. A $95 a year; Canada A $117.70 (including 7% GST, GST #126659952); Central & South America A $110 a year; Europe A $165 a year, all other countries A $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label from front cover of the publication.

*Network World* can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

*Network World* is distributed free of charge in the U.S. to qualified management or professionals who meet ALL of the following criteria:

1) Have site purchasing influence.
2) Are involved in the purchase of network products and services.
3) Have multi-platform networks installed or planned (including network architectures, LAN operating systems and LAN environments).



POSTMASTER: Send Change of Address to *Network World*, P.O. Box 3090, Northbrook, IL 60065.



USPS 735-730

# SVCs promise to further boost frame relay growth

**By Joanie Wexler**

Frame relay usage is skyrocketing, and the emergence of switched virtual circuits (SVC) this summer could fuel it further.

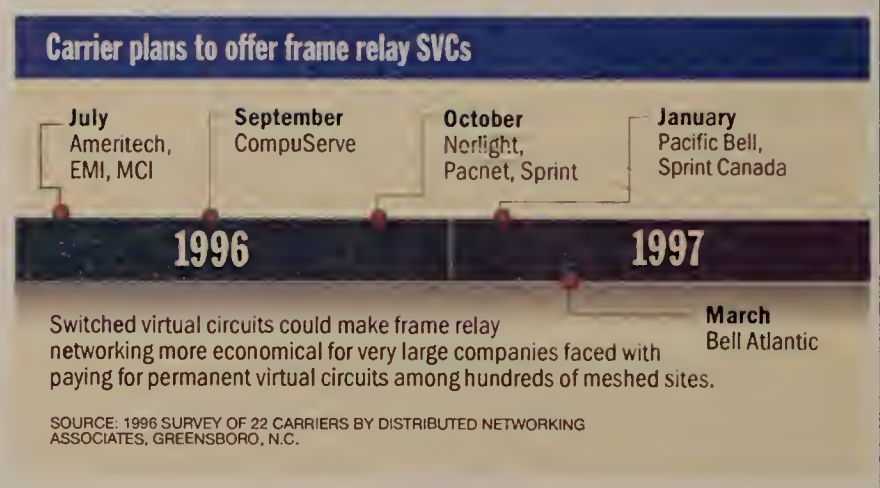
The number of users nearly tripled last year, according to a new report commissioned by the Frame Relay Forum, which surveyed 22 carriers about their service plans and the habits of their frame relay customers. And with SVCs on the way, there's no slowdown in sight.

MCI Communications Corp. and regional interexchange carrier EMI Communications, Inc. are planning SVC offerings in July, and several other carriers have rollout plans later this year and next, according to the survey conducted by Distributed Networking Associates in Greensboro, N.C. (see graphic).

SVCs could enable customers to cost-justify bringing up small remote sites by allowing them to simply plug in to a frame relay network, communicate with anyone else connected to it and pay based on usage.

Currently, frame relay services are based on preconfigured links called permanent virtual circuits (PVC). These are priced based on the minimum speed guaranteed between two sites, called the committed information rate, plus the speed of the ports on either end of the PVC.

"SVCs should theoretically allow us to afford to bring our small field offices onto the frame network for LAN interconnect," said Pat Jerich, director of IT operations at Carlson Companies, Inc. in Minneapolis, an MCI frame relay customer.




Users see SVCs as a potential way to further reduce costs and add inexpensive bandwidth for disaster recovery and traffic overflow. But it all depends on how they are billed.

Mike Cardali, MIS manager at Somerset Tire Service, Inc., an EMI customer based in Bound Brook, N.J., noted his users stay logged on all day, but the amount of data actually sent is low.

So if the carriers "charge by connect time, we'd be hard-pressed to see a cost advantage. But if they bill by frames, we might make out," he said.

On the other hand, United Technologies Corp. in Newington, Conn., "fears per-packet billing" because it has high usage among its 450 AT&T and SITA Group frame relay nodes, said Jim Garlans, manager of network services.

SVCs will most likely pay off for large companies with extensive networks. "Even if a PVC is only a few dollars a month, a company with 200 sites fully meshed would need more than 38,000 PVCs," which could cost more than $100,000 a month, according to Steven Taylor, president of Distributed Networking.

He added that SVCs will likely be more economical for sites with random and infrequent traffic patterns. ■

## NBase

*Continued from page 1*

of my buildings over fiber, said Moshe Cohen, vice president of operations at The Network Group, Inc. in Westlake Village, Calif. "This gives users an upgrade path from 10M to 100M to 1G bit/sec Ethernet all in one box."

### No stranger to speed

NBase is no stranger to fast LAN technologies. The 3-year-old company offers one of the few autonegotiating 10M/100M bit/sec Ethernet switches on the market.

In fact, NBase has quietly become a key LAN switch player by selling more than 1,000 switches and quadrupling its switch revenue this year over last year, according to Noam Lotan, the company's president and chief executive officer.

NBase's existing MegaSwitch II is a store-and-forward device that offers as many as 12 ports that autoconfigure to 10M or 100M bit/sec. The switch also has two option slots, which is where the one-port gigabit modules will fit.

NBase's gigabit Ethernet implementation expands on the existing 100Base-T standard to use the Fibre Channel physical layer. Both the IEEE 802.3 and 802.12 committees are currently developing gigabit Ethernet specifications with which NBase will comply.

NBase chose to develop a full-duplex gigabit Ethernet module because it does not have the performance or distance limitations of half-duplex products, according to Yechiel Kurtz, director of switch operations at NBase. Unlike full-duplex Ethernet, half-duplex Ethernet involves collisions that reduce the overall bandwidth utilization to about 40% actual throughput.

Also, half-duplex gigabit Ethernet can span distances of only 25 meters, whereas full-duplex links can extend 2 km, he said.

In addition to gigabit Ethernet, Kurtz said NBase will offer ATM support.

NBase also plans to offer a multiport gigabit Ethernet switch, which will ship in the first half of 1997.

The gigabit Ethernet module for the MegaSwitch II will be priced at less than $2,500.

©NBase: (818) 773-0900.

# ON bursts into firewall market

*ON Guard turnkey package supports both IP and IPX network traffic.*

**By Ellen Messmer**

*Cambridge, Mass.*

ON Technology Corp. this week will break into the firewall market with a low-cost offering that supports traffic based on TCP/IP or Novell, Inc.'s IPX protocol.

The product, called ON Guard, is designed to control and audit application use for between 250 and 15,000 end users across the Internet or on intranets. ON Guard consists of software and an Intel Corp. 486-based PC.

The firewall's features include data scanning to winnow out viruses such as the Word.Concept macro virus before they can do any damage to an intranet.

The offering can also shield corporate users' IP addresses from view on the 'Net, where everyone from hackers to marketing mavens wants whatever information they can glean about user identity.

According to Jay Batson, vice president of engineering at ON Technology, each time a user wants to transit the firewall, ON Guard will check the address using a procedure called stateful inspection. This procedure prevents the firewall from letting in any traffic or anyone that might try to abuse a company's Domain Name Service.

Because ON Guard supports IPX traffic, it also can be used to cordon off IPX traffic from other traffic.

ON Technology is set to add encryption capabilities based on the emerging IETF standard for packet encryption, IP Security.

The company is offering 30-day free trials of ON Guard, which begins shipping this week and is priced at $7,500.

The firewall joins a collection of other products in ON Technology's arsenal, including group scheduling and collaboration tools.

©ON Technology: (617) 692-3545.

## Cabletron

*Continued from page 8*

gear more than doubled last year to $425.4 million from $178.1 million in 1994, according to the Dell'Oro Group, a consultancy in Menlo Park, Calif.

The Network Express acquisition also will make Cabletron less reliant on Xylogics, Inc., which provides much of Cabletron's remote access gear but was bought out by rival Bay Networks, Inc. last year.

Currently, Cabletron offers terminal server and analog dial-in devices for commercial customers. It is also developing ISDN modules for its Multi Media Access Center wiring closet hub and MMAC-Plus backbone chassis to be used by telephone companies (*NW*, Feb. 5, page 1).

Network Express products will expand these offerings to give Cabletron its first ISDN access devices designed for commercial small offices, branch offices, corporate headquarters and Internet service providers.

**Company:** Network Express

**Location:** Ann Arbor, Mich.

**Core business:** ISDN access devices

**1995 revenue:** $18.9 million

**Employees:** 135

One analyst said Cabletron is somewhat late to the ISDN market.

"All of Cabletron's major competitors have acquired ISDN technology, so they really need a remote access story," said Esmerelda Silva, an analyst at International Data Corp., a consultancy in Framingham, Mass. "Also, Network Express is a good move for them after they clearly missed the boat on buying Xyplex," which was acquired by Whittaker Corp., she said.

Industry observers said the acquisition brings some much needed financial stability to Network Express. The Ann Arbor, Mich., firm suffered a net loss of $8.5 million for 1995, largely because of expenses to cover its acquisition of Fivemore, Ltd., a British ISDN hardware vendor. ■

# Shameless promotion and the many benefits of private intranets

Once again, it is the second quarter of the year and time to start my next seminar tour. <shameless plug> It is time to gird my loins with cheap girders and prepare to begin the Gibbs & Co. world tour, taking Intranets: Tools, Technologies and Strategies to 14 cities and New Zealand in the next three months.

<bold, very bold>This is a seminar you absolutely must attend.</bold, very bold>

It will educate and it will elucidate.<barefaced lies>Not only that, but it will also cure male-pattern baldness, whiten your whites and improve your tennis.</barefaced lies>

All that and tell you everything you could possibly want to know about intranets.</shameless plug>

*(Editor's note: Gibbs thinks the above pseudo-HTML tags are funny. You agree? jdix@nww.com.)*


Mark Gibbs

What is so interesting about intranets is that they represent a completely new way of thinking about corporate networking. I would, if I were a fellow of less staunch constitution, resort to a phrase like, "intranets are an important paradigm shift," but I can hardly bring myself to recycle such a horrible term. However, I digress.

This new thinking takes Internet technologies and makes them go hand in socket with new concepts in how to supply IT services. While these technologies are primarily Web based, there are other extremely valuable intranet services, such as videoconferencing and virtual reality, that promise whole new ways of publishing and interacting with all sorts of information.

Many aspects of intranets overturn conventional thinking about information technology, how you implement and manage it, and who is involved. One of the issues that is fundamental in understanding why the para. . . , uh, new way of thinking about networking is actually different is recentralization.

Recentralization reverses the-network-is-the-computer nonsense that so many vendors have talked about over the past few years. (I regret that there will be at least two questions I will never find answers for: What does 'the network is the computer' mean, and what is Victoria's secret?)

*What does 'the network is the computer' mean, and what is Victoria's secret?*

What is starting to be understood is that the correct view of the network is, the network is the value of the services supplied — not some kind of abstract technical dream. But before you get all hot and bothered and start complaining, "Isn't that what a mainframe was?" let me stress that it absolutely isn't. The terminals on the desks aren't dumb. They don't have the lack of flexibility that mainframes suffer from. And the price is right (hmm, that would make a good name for a game show).

A consequence of recentralization is it gives a reason to eschew that sheep-like compulsion so many organizations had for that client/server thing that was such a core component of the decentralization trend.

Client/server had, and has, its place in the corporate network, but the problem is that it doesn't really work for the majority of companies. For most applications in most organizations, the cost-and-time consequences of the development and maintenance cycles of client/server architectures are simply too great a burden to tolerate.

Mark my words: Intranets will kill off client/server. Now, if they could just kill off the p-word.

This week's notes: 1. Videoconferencing: check out Connectix' Videophone (www.connectix.com) — a fabulous tool and, for its price, a tremendous value — I'll review this soon; and 2. My editor (the slasher) cut out a joke from last week's missive on the grounds that it might not be acceptable.

To find out what the joke was and establish community standards for *Network World,* drop me a note at cut-joke<JokeServ@gibbs.com>.

*For everything else, contact me at mgibbs@gibbs.com.*

# Getting relief with Olympic bathrooms and virtual LANs

While three million Atlanta residents brace for the onslaught of another three million visiting Olympic thrill seekers, we locals have drifted into bathroom talk. Put bluntly, we're wondering where people will go — to find a bathroom, that is.

This is an Olympic-size problem. Apparently, the Atlanta Committee for the Olympic Games rented about 1,800 portable potties for Olympic venues. But neither the Committee nor the city of Atlanta wants to spring for an extra $3 million to place potties at nonvenue locations. (Hint: Network companies sponsor sports arenas; why not Olympic porta-potties?)


Dave Buerger

Local hotels and restaurants are nervous about overflows. Those of us hiding in the suburbs are placing bets. Odds are that Americans will panic and burst; Europeans will calmly go in the street. You have to go when you have to go.

As Olympic visitors will learn, life is more enjoyable when you don't have to fret about the plumbing.

*Network companies sponsor sports arenas; why not Olympic porta-potties?*

That also happens to be the thinking behind some other plumbing-related news: Bay Networks, Inc., IBM and 3Com Corp. last week allied to promote simplified construction of LANs. These competitors call their effort the Network Interoperability Alliance (NIA).

Aside from spawning a new acronym, the gang of three will focus on switched networking by providing systematic interoperability testing, system framework definition and joint standards submissions in the areas of desktops and servers, edge networking, core networking and network management.

Confused? So are other experts I queried about this alliance. No one is sure what substance it brings to the table other than joint marketing.

For example, the NIA is right to identify interoperability of virtual LANs as a major problem. Yet it's largely a theoretical problem because VLANs are as rare as toilets will be during the summer games.

NIA's three members want to rule this arena once it materializes. The three boast a combined 38% market share of the installed base of hubs, switches and network adapters. But this is mostly gear from the old world of shared media. The NIA actually wants to give its installed base of users hope for a smooth transition into the world of switched LANs.

Hence, its emphasis on backward compatibility of new products with installed gear.

The formation of this alliance is evidence of growing frustration with the falling productivity of standards bodies. The triumverate denies competing with the IETF, IEEE and ATM Forum. NIA members — thanks to substantial participation in these groups — actually claim ownership of some initiatives already under discussion, such as quality of service and routing standards.

But NIA intends to selectively bless some standards over others and rush them into products. NIA will thus be a high-powered lobby. It sees itself as a practical arbitrator, integrating disparate technical standards development efforts of the aforementioned groups.

Some people are not happy with this idea. After all, the purpose of standards bodies is to offer independent means to derive technical standards. As with any political body, consensus decisions can be slow. NIA naturally wants to speed this process by using its own clout.

NIA's three members are not worried about losing sales to each other. They'd rather have a smaller share of a big future market than dominance over relatively nothing.

And speaking of dominance, Cisco Systems, Inc., which claims about half of the switching market, was not asked to join. The NIA says it did not think Cisco would be interested. Cisco said it would implement NIA's standards if they are also approved by standards bodies. But it has no plans to join the alliance.

Let's hope the NIA's worthy aim to simplify LAN interoperability does not backfire and balkanize the standards process. Our plumbing may not be perfect, but at least the pipes are flowing.

*Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.*


# NOTE:
# OUR FAMILY HERITAGE.

As you'd expect, our JetDirect print servers are chips off the HP block. So quality and reliability are givens. And so is full compatibility with HP printers, new and old. On virtually any network.

But did you know how well our print servers manage all your printers? Even the ones we don't make.

Easy set-up. Monitoring. Trouble-shooting. Remote management.

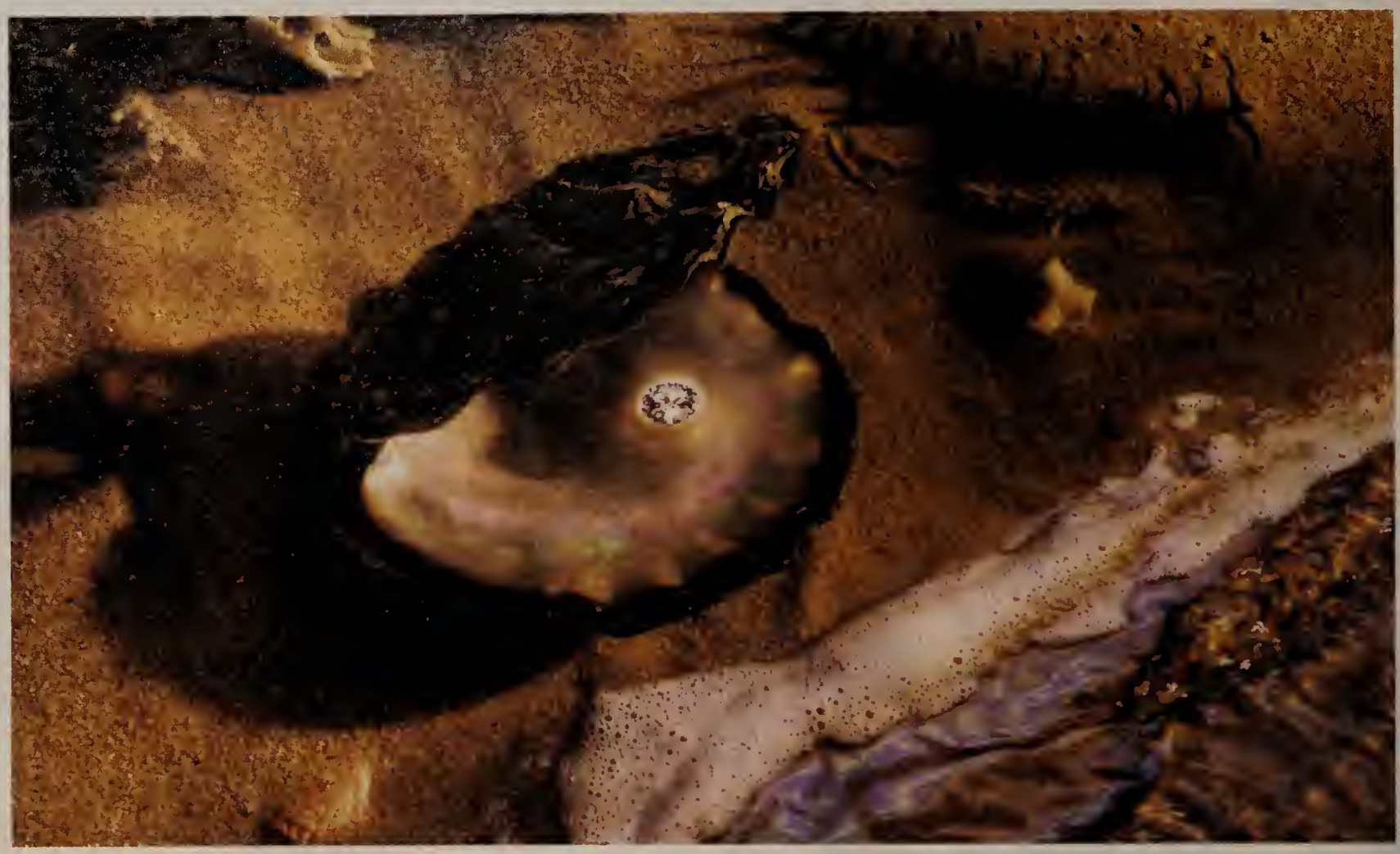
What else would you expect? We live and breathe network engineering.

For detailed specs, visit http://www.hp.com/go/network_city. Or call 1-800-533-1333, Ext. 1615.



HEWLETT® PACKARD

# We Always Try To Over Deliver.



Something you can count on from the leader in seven out of ten networking categories.

Nobody knows networks like we do. And, judging from our number one market share in seven out of ten networking categories, nobody builds them as well as we do, either.

You owe it to yourself to talk to Bay Networks. We're the source for building a complete, standards-based network that grows with you—whether you need switching, shared media, routing, or remote access. Or all of the above.

With Optivity® network management, you ensure the overall integrity of your network. And with Bay Networks, you get 7x24 global support for your entire network.

So visit our Web site at www.baynetworks.com or call 1-800-8-BAYNET, ext. 95 for a worldwide market share comparison. And see how Bay Networks can deliver more to your network.

**BAY NETWORKS**
**WORLDWIDE MARKET SHARE**

| | |
|---|---|
| **NETWORK MANAGEMENT** | |
| Windows/DOS | #1 |
| UNIX | #1 |
| RMON | #1 |
| **HUBS** | |
| Ethernet | #1 |
| Token Ring | #1 |
| **SWITCHES** | |
| Token Ring | #1 |
| Ethernet | #2 |
| ATM | #2 |
| **ROUTERS** | #2 |
| **REMOTE ACCESS** | #1 |

*Source: Recently published reports from Dataquest, IDC, and/or Dell'Oro Group.*



Bay Networks
People connect with us